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EDITORIAL.

Padi Planting Methods.

In this issue we place on record the customary methods of planting padi in different parts of Malaya. The account has been compiled from reports prepared by Agricultural Officers in the areas concerned, who also supplied most of the illustrations. Discussion of the varieties of padi grown in different parts of the country and under varying conditions of cultivation, and the milling of rice are outside the scope of the present article. Malay words of implements used for the various operations of planting are freely scattered throughout the article. While this does not pretend to be an exhaustive list of words in common usage amongst Malays, it is thought that the inclusion of such terms may be of assistance for those whose duties take them amongst padi planters.

In reading this account, one cannot but be impressed by the ingenuity of the planters in evolving implements and methods of cultivation suited to the conditions peculiar to each locality. Furthermore, the Malay cultivator's eye for levels and success in devising methods of irrigation should not pass unnoticed. The time-honoured customary methods used are doubtless capable of improvement, but it has been the experience of officers of the Department of Agriculture that Malay methods of cultivation cannot be lightly brushed aside in favour of modern methods; rather the investigator must introduce inovations with the utmost caution and only after exhaustive trials at local experiment stations.

While this account details the variations in systems to suit local conditions, it is not intended to advocate any of these methods for general or localized application. The system to be established in any new centre of production must be devised to suit local conditions.

The padi cultivator has many difficulties to overcome, and wide experience in the cultivation of other crops is of very limited value when it comes to padi planting. Generations of Malays have planted their ancestral holdings from year to year, and they have thus given their heritage of knowledge and industry to the present-day Malaya, a heritage not only of a countryside beautified by their labours, but the insurance of this country against serious food shortage by the annual supply of about 40 per cent. of the requirements of the staple food of about 98 per cent. of the total population of this country.

Original Articles.

PADI PLANTING METHODS IN MALAYA.

Compiled by the Economics Branch of the Department of Agriculture, S.S. and F.M.S., from Reports of Field Officers.

The variations in customary methods employed in different parts of the country for the cultivation of rice have originated in a large measure by reason of local conditions. Chief amongst these conditions are nature of the soil, distribution of rainfall and adequacy or otherwise of irrigation, topography, and to some extent, the degree to which the planter relies on his padi crop for his livelihood.

Padi planting is essentially a Malay industry. In certain large districts, notably Krian in Perak, harvesting is largely carried out by Indian immigrant labourers working on contract, but elsewhere the cultivation of this crop is a time-honoured Malay industry, and the methods employed to-day the result of very long experience of local conditions. In the days when communication between one district and another was difficult, there could be little exchange of ideas; in more recent years the padi-planters of one area have visited other padi areas and have thereby been able to improve their own methods by taking advantage of the experience of others.

The main areas of padi cultivation in Malaya are Kedah with Perlis, covering about 40 per cent. of the total area, Kelantan about 20 per cent., North Perak with Province Wellesley about 15 per cent, while very much smaller but well defined areas of cultivation are mainly in Trengganu, Malacca, Negri Sembilan and Pahang. In view of this pre-eminence of the first-mentioned States, the methods adopted in these areas will be given more notice than those customary in areas of less importance.

Rainfall.

The average annual rainfall in Kedah is 89 inches, the wettest months being August and September. A fine dry period with strong N.E. winds is experienced from the middle of December to the beginning of March, followed by April rains.

Kelantan experiences rainfall from about July and commencement for the cultivation for the next crop depends on the efficacy or otherwise of these rains on which the cultivators depend to soften the soil sufficiently to allow the plough to penetrate. The main wet period in Kelantan and Trengganu is from October to December.

In the Krian District of Perak and in Province Wellesley the main rainfalls have their peaks in April/June and October/November.

Necessarily, the dates of cultivation of the land and planting of the crop depend very much upon the rains, the object being to prepare the land when it has been softened by rains, to have sufficient water available to irrigate, or flood the land from the time of transplanting until flowering, and to be able to draw off the water

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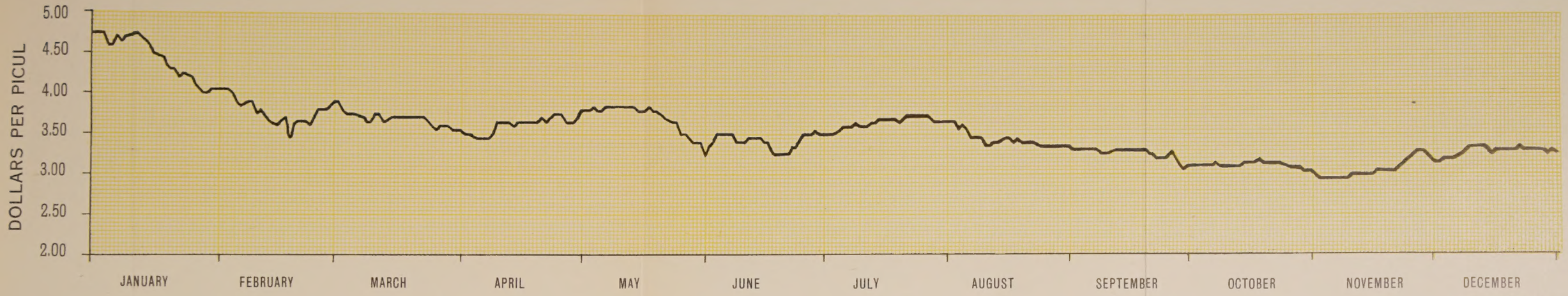

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and to harvest during fine weather. The dates of commencement of rains in most parts of the country, however, are so uncertain that many disappointments are experienced, and the crop frequently suffers through unseasonable weather. The improvement of irrigation, therefore, to which many Government schemes have been directed while others are still in hand, may be expected materially to better the lot of the cultivator and to result in increased yields per acre.

Soils.

Soils in which padi is cultivated vary widely, and influence greatly the methods of cultivation. The Kedah areas consist mainly of a deep stiff clay, Krian and Province Wellesley of a heavy clay with a good organic matter content, and the heavy clays are also found in many other areas. In addition, padi is grown on lighter soils, and in water-logged organic soils. Good crops are also found on the inland valley alluvium soils, notably in Negri Sembilan, Selangor and Pahang fed by rivers which wind through the padi areas.

Water Control.

The Krian area in Perak has for many years had the advantage of a controlled drainage and irrigation system, executed and managed by the Government. Other smaller areas have a similar advantage, but in the main, the padi areas in this country are served by rivers, and the Malays themselves have been responsible for the means of harnessing the natural water supply for the irrigation of their fields by such means as brushwood dams and water wheels made mainly from bamboo. Many of these are now replaced by permanent and effective structures erected by the Drainage and Irrigation Department. In water-logged areas, the grower is dependent entirely on local rainfall, and necessarily the area he can plant in any one season depends upon the rainfall in that particular season.

Cultivation.

The nature of the soil and the water supply determine the amount of preliminary cultivation which is possible or necessary and therefore the kind of implements used. The Malay cultivators have devised a number of ingenious implements to serve their purpose of cultivating their land for padi.

Ploughing is possible on most irrigable areas, but in real swamp lands which rarely dry out, the depth and softness of the peaty soil would result in the plough sinking, and in these areas, other methods, described below, have been devised.

The plough usually employed is a light single furrow plough, single shafted, made of wood with an iron share and breast, or it is made entirely of wood except for the share which is shod with iron. It is usually drawn by one buffalo or by two oxen.

Various other implements are used, some fairly generally, others only locally. These are described under the States in which they are found.

Systems of Cultivation.

There are two main systems of padi cultivation, *viz.*: wet system and the dry system, 90 per cent. of the total area being cultivated under the wet system. But there are variations of both these main systems to suit local conditions, wet systems involving considerable preliminary cultivation as opposed to systems where cultivation is practically impossible owing to the soft nature of the land; dry systems which include ploughing and raking, and a dry system which merely entails the clearing and burning the jungle in preparation for the crop.

In the cultivation of "wet" padi the general procedure (of course with local variants) is to plough or dig the land once or twice, and rake and smooth it with a roller. The seed is planted in a nursery and is ready for transplanting in the field after 40 days. The seedlings are planted three or more per hill, about one foot apart. After cultivation consists of weeding.

In dry padi cultivation the land is sometimes ploughed twice, raked and the seed sown by hand or drilled; or seed planted in clumps about a foot apart, or in hill cultivation, virgin land is cleared, burned and the seed broadcast.

Manuring.

Generally speaking, manuring is not a common practice in padi cultivation. In Kedah and Perlis, where bat guano is easily procured, the land is periodically manured. In Kelantan a system exists in which each plant, after transplanting, receives a small application of burnt mixture of cowdung and earth, coconut and arecanut leaves. In parts of Perak and in Province Wellesley and Malacca, the seedlings are steeped in a mixture of mud, phosphate, and ashes immediately after removal from the nursery.

WET PADI PLANTING IN DIFFERENT STATES.

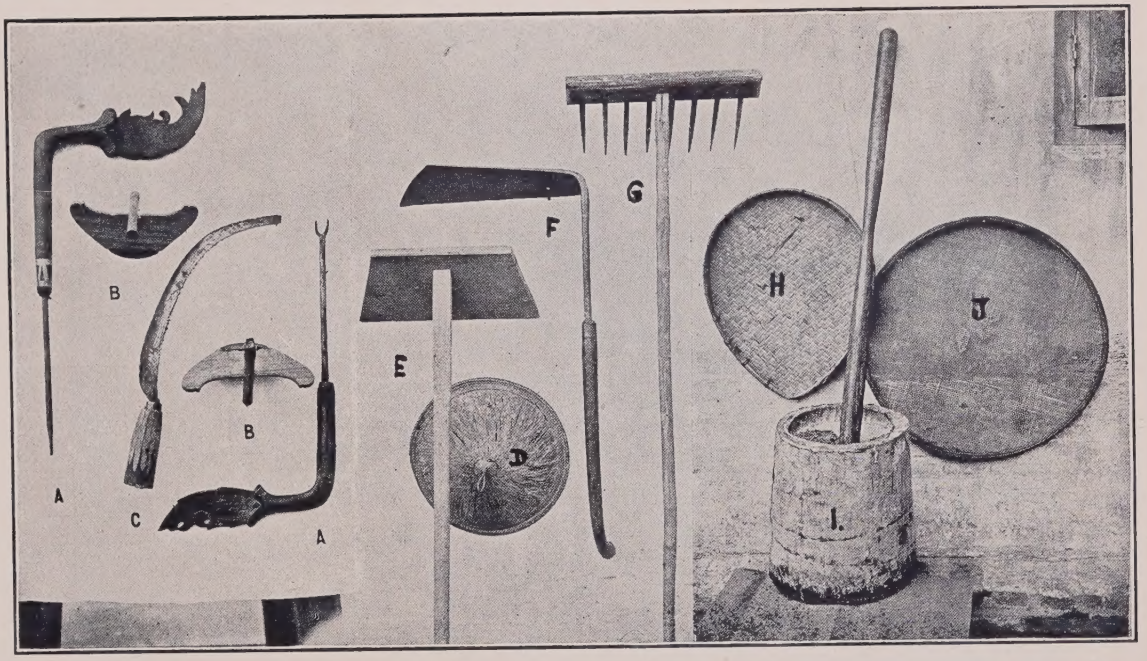
Krian District of Perak.

Soils.—The system of padi planting adopted in the Krian irrigation area of Perak—about 50,000 acres—includes features not met with elsewhere. The yields obtained, largely on account of the effectively controlled irrigation system and the good soil, are amongst the highest in Malaya.

The soils of the Krian irrigation area are of three main types: (i) blue grey clays with overlying deposits of rich alluvium; (ii) mottled reddish-grey clays and (iii) peats.

The coastal portion of the Krian District at one time formed part of a wide alluvial mangrove swamp. The soils are blue-grey clays, heavy in texture and overlaid by deposits of alluvium of varying depths. These soils are rich in essential plant nutrients and are capable of producing extremely heavy crops of padi. The reddish-grey clays constitute the higher land areas. They are capable of carrying good crops provided that irrigation facilities are adequate. The low-lying peat areas—peat of various depth overlying a clay subsoil—present difficulties in drainage and cultivation and produce poor crops.

Field Planted with Wet Padi.



Implements used in Padi Cultivation.

A. *Kuku Kambing.*
B. *Pisau Menuai*
C. *Sabit*
D. Sun Hat.
E. *Kais*
F. *Tajak*
G. *Sikat*
H. *Niru.*
I. *Lesong Tangan*
J. *Intau* (Rice Sifter)

Nurseries.—The Krian system is that of a wet nursery with multiple transplanting. The number of transplantings varies; in the coastal areas three transplantings are carried out, while two are usual in the higher lands.

A "floating" seed bed (*rakit*) is prepared by cutting down the fallow weed growth and piling it in a long strip, 3 to 4 feet wide, until the pile stands an inch or two above water level. On this foundation, sufficient clay is plastered to make the whole into a compact bed, on the top of which a thin layer of mud, rich in organic matter, is placed. Should the level of the water in the field rise, the nursery rises and thus maintains its surface above water level.

The normal seed rate is 2 to 5 gallons per acre, depending on the fertility of the soil. The seed is soaked in water for about 3 days (*merendam*) and maintained in a moist condition for a further period of 2 days (*mengering*), during which time it germinates. The germinated seed is then broadcast (*menabor*) thickly and evenly on the seed-bed. The bed is then protected from birds and the sun by a layer of leaves, which is removed after about 7 to 10 days. About 2 days later the young plants, now about 6 to 8 inches in height, are pulled up in clumps of 150 to 200, and with the soil adhering to their roots, are placed in the field so that their stems stand in a few inches of water (*menurun*).

The second transplanting (*meredeh*) takes place some 10 days later, each large clump of 150 to 200 seedlings being sub-divided into about 10 to 12 smaller clumps and transplanted in rows, each clump occupying some 2 square feet of space. The seedlings remain in this nursery (*perdeh*) for approximately 40 days, after which final transplanting in the field takes place.

Preparation of the Land.—Irrigation usually commences a few weeks before the scheduled time for sowing nurseries, with the result that, when operations for the season commence, the land is normally inundated to a depth of from 2 inches or more.

In clearing the fields, the fallow vegetation is cut down by means of an implement (*tajak*) resembling a short-bladed scythe. It is swung from above the shoulder in a downward sweep, so that the vegetation is cut at, or slightly below, ground level. The clearing of the land, which commences after the nurseries have been put down, is often carried out on a co-operative basis (*berderau*). The cut vegetation lies *in situ* to rot down as far as possible and after about a fortnight is raked (*melonggok*) into heaps or long lines further to facilitate rotting.

From 4 to 6 weeks after cutting, the land is cleared by raking the heaps to the edge of the field where they are piled to construct the division bunds (*batas*) between fields, or the rotted growth is scattered throughout the field (*mengechar*) and incorporated into the soil.

The burning of stubble is sometimes met with in Krian as a preliminary measure in clearing the fields.

Planting in the Field.—The seedlings are pulled from the nursery by men who cut off the top 6 to 8 inches of leaves and prune the roots. Planting (*menanam*) is carried out almost exclusively by women, who dibble in the seedlings by means of

an implement (*kuku kambing*) consisting of an iron rod 12 to 15 inches long, with a wood handle and provided with two prongs of about 1 inch in length set about half an inch apart and at an angle of about 30°.

Cultivation after Transplanting.—In rich soil areas, the young padi plants make rapid growth and quickly form a canopy under which weeds fail to thrive. The usual number of weedings carried out varies from one to three, more frequent weeding being necessary on the poorer types of soil.

Drainage of water from the fields is carried out gradually once flowering has become general. Complete drainage takes place once the grain has "set" and ripening commences.

Between planting and harvest, in many places, the bunds dividing fields are planted with vegetable and other food crops. The owners employ their time in planting such crops, and in such occupations as fishing and rubber tapping—often to the neglect of their padi crop.

Harvesting.—In the best areas, it is usual to sow varieties of padi which take from 7 to 8 months to mature. The nurseries are laid down about June so that the harvest is timed to coincide with the short dry season which falls early in the year, generally in February.

The crop, provided it has ripened evenly and has not suffered extensive lodging due to rain or strong winds, is normally reaped with a serrated sickle (*sabit*). About 2 feet of straw carrying the ears is cut and laid to dry in loose sheaves, on the stubble. When dry, the sheaves are bound loosely with straw and carried to a large open tub, some 4 feet wide and 3 feet deep, inside which rests a short ladder with rungs about 4 inches apart. The sheaves are beaten (*memukul*) four or five times against the ladder, causing the grain to be separated and to fall into the tub, the straw being then discarded.

To harvest an unevenly ripened or lodged crop, a small knife (*pisau menuai*) is employed with which each ear is harvested separately. This small knife consists of a short narrow blade attached to the convex side of a thin wooden crescent-shaped base, and is held in the palm of the hand. In threshing a crop cut in this manner, bundles of ears are laid on grass mats and the grain trodden out by men.

Winnowing (*mengangin*) is effected by means of a circular tray-shaped basket (*nyiru jarang*) about 2 feet in diameter and of half inch mesh, suspended by strings from a tripod of stout bamboo poles rather more than 6 feet long. The dried padi is placed on this basket-sieve which is gently rocked from side to side so that the padi steadily falls through. The wind carries the dust and empty husks beyond a matting placed below the tripod to receive the padi falling through the sieve. This sieving is repeated once or twice and the cleaned padi transferred to storage bins or bagged for sale.

Province Wellesley and Penang.

The padi area in Province Wellesley is a continuation of that of Krian, but soil conditions are different in areas further removed from Krian. That is to say, the land near Krian is of the same deep nature as the Krian land, which does not

permit of the use of the plough. Similar conditions exist in Penang Island; for these areas the *tajak* is employed to the exclusion of the plough.

The greater part of the padi area in Province Wellesley, however, consists of alluvial valleys or flats, where the soil is sufficiently firm to allow a plough to be used.

Water Supply.—With the exception of Sungei Acheh (within the Krian irrigation area) and the Sungei Kulim, Tasek Junjong and Kubang Semang areas in Province Wellesley and areas on Penang Island where irrigation facilities have been provided, all padi lands in Province Wellesley rely entirely on the retention of rainfall for water supply; consequently, during periods of excessive rainfall, flooding occurs in many districts. Alternatively, during droughts there is an insufficiency of water for the successful cultivation of the crop.

Nurseries.—Where the soil is deep the Krian system of nursery beds is used, and the seedlings are transplanted twice before being planted in the field.

When the padi land is of a shallow nature, the nursery site is chosen where water is readily available. The land is cleaned with *tajak* and is afterwards ploughed, or sometimes dug with a *chankol.* This work is done when the land is in a moist condition. After this partial cultivation, water is run into the nursery for a few days. The water is then run off and the final operation of levelling effected by dragging a float over the surface. This float usually consists of the stem of a banana plant, or a round log of wood.

The seed is germinated before sowing (as described under the Krian system). From 3 to $3\frac{1}{2}$ gallons of seed are sufficient to plant one acre of land and a nursery bed of about 1/40th acre easily accommodates this quantity of seed.

When the seed is broadcast, the soil is in a damp condition, but as the seedlings develop, water is run into the nursery bed to a depth of about an inch.

The period of time during which the seedlings are maintained in the nursery depends solely upon the maturation period of the particular variety of padi; 30 to 35 days being the usual period for a 5 months' maturation variety, 44 days for a 6 months' maturation variety, and 60 days for varieties which take more than 7 months to mature.

Cultivation.—As stated above, the deep soils are cultivated with the *tajak* as in Krian; but such land constitutes only a little more than 10 per cent. of the total area under the crop in this Settlement. Elsewhere the plough is used. In the plough areas, weeds are usually abundant and this fallow vegetation is first cut down by *tajak* a few inches above ground level, permitted to dry and then burnt; or if the weather is wet the vegetation is allowed to rot.

After the first rains have fallen, about the end of May or early June and when the land has become softened, ploughing is commenced. In seasons of adequate water supply, a single ploughing suffices, but when first rains are followed by a period of dry weather, a second ploughing is often deemed necessary. The land is then harrowed. The effect of the harrow is to break surface clods and level the area, as well as to puddle the soil to the desired consistency. The implement is 3 feet 8 inches broad, and has 12 tines each 1 foot long and spaced 4 inches apart.

During the operation of this implement the roots of weed growth are collected by the harrow and left in heaps when the tines are released from the soil which the operator does by lifting it clear. The mass of roots is allowed to decompose for about a week when a second harrowing is done. The field is then rolled by means of an implement 6 feet long, which has 6 flutes, each 4 inches deep. The roller is carved from a single log of wood, the draught, as for the harrow, being a water buffalo. The roller reduces the surface soil into a fine well-puddled condition. Rolling is often omitted.

Transplanting.—Transplanting in the prepared field is done by women, usually by dibbling in with the implement *kuku kambing* (see under Krian), or by hand in very soft soil, when a bunch of 3 or 4 seedlings is held by the base and thrust into the mud with the thumb of the right hand. In a few very hard areas, a wooden dibble (*chekam*) is used.

Weeding.—The general practice in Province Wellesley and Penang is that in areas where weeds are present, they are removed by hand one month subsequent to transplanting, and a second round of weeding is sometimes carried out one month later.

Harvesting.—Dates for the commencement of harvesting vary in the several divisions of the Province and Penang, Province Wellesley North commencing during late December or early January, Province Wellesley Central during late January or early February, and Province Wellesley South and Penang Island during the month of February.

In areas where belief in the "spirit of the crop" is adhered to, or where uneven maturity occurs, the crop is cut ear by ear with the small knife held in the palm of the hand, known here as *renggam*, but further south as *pisau menuai* (see under Krian). The ears with about 10 inches of straw are tied in bundles, sundried and stored in this condition. In the more extensive padi areas, and when even ripening has occurred, the sickle is used, as in Krian.

The stubble is generally allowed to decay on the ground and the straw which remains after threshing is heaped and burnt or left to decay.

Dry Rice in Province Wellesley North.

In a few small areas in Province Wellesley North, where dry-land rice is grown, cultivation is commenced in April, as soon as the first rains have fallen. The *tajak* or *parang* is used to clear the vegetation, which is then burnt. Usually no further cultivation is undertaken, but sometimes the land is dug over with a *chankol*.

Male members of the family dibble holes 1 inch deep and 12 to 15 inches apart; they are followed by women who plant 3 or 4 seeds per hole and who then fill the holes loosely with surface soil. At times of labour scarcity, the complete operation is done by women who operate the dibble with the left hand and plant the seeds with the right hand.

Harvesting is performed with the small knife *ranggam*, ear by ear. The ears are tied in bundles, dried and stored.

Rake and Roller Combined.

Threshing Tub.

Cultivation with the *Tajak*.

The Malay Wooden Plough.

Kedah.

Kedah possesses one of the largest and most fertile padi growing areas in Malaya. It is mainly situated on a large alluvial plain following the coast, having a total length of 44 miles and a breadth of from 8 to 14 miles.

Soils.—The soil, which is usually several feet deep, consists mainly of a stiff clay, but somewhat lighter clays occur in certain parts.

Water Supply.—The crop is almost entirely dependent on local rains, and the Government has constructed drainage works and canals with the object of combining conservation of rainfall with drainage of the land when required.

Preparation of the Land.—With the advent of rains in April, the small solid bunds around the fields are repaired. It takes several weeks for the land to become flooded after the dry season for during this period the water table may sink to a depth of nearly 10 feet. By the end of May, however, the land is generally workable and cultural operations are commenced.

Cultivation.—The land, on which there are 1 or 2 inches of water, is ploughed and cross-ploughed to a depth of 3 to 4 inches. Weeds are allowed to rot for a period of 3 to 4 weeks and then the land is raked. Raking is continued until all weed growth is destroyed and the surface soil sufficiently broken down. Rolling next takes place and at this juncture it is often necessary to drain off some of the water.

There are certain areas, generally newly opened, where a plough cannot work on account of the soft nature of the soil or the presence of roots. These areas are cultivated with the *tajak* before raking and rolling.

Nurseries.—Nursery beds are made and planted in July and are sited to permit of satisfactory water control.

The seedlings are removed from the nursery at 44 days from planting. The leaves and roots are pruned and if manuring in the field is not practised, the roots may be dipped in bat guano before transplanting. This is done by digging a hole in the ground 1 foot square and 6 inches deep into which a certain quantity of guano is placed and mixed with water to form a thick paste. The seedlings are steeped in this mixture overnight before planting. Seedlings are then planted direct into the field, *i.e.* there is no second nursery.

Bat guano, obtained from local limestone hills, is extensively used, usually at the rate of 1000 lbs. per acre every three years. It is broadcast in the field.

Transplanting.—Transplanting is performed by women either with the fingers, or using the *kuku kambing*, the plants being spaced from 15 to 18 inches apart.

The maturation period of varieties of padi grown in Kedah varies from 5 to 8 months. Short-duration varieties of padi give a smaller yield and are generally planted on light soils where the retention of water is a difficult problem. The longer-term varieties are planted on the deep soils and newly-cleared jungle areas. Varieties with a 6 months' maturation period are the most favoured.

Vacancies are supplied a week or so later and work then ceases until harvest time, with the exception of an occasional weeding by *tajak* or hand.

Water is retained on the land till the plants come into flower, usually early in December, and from then onwards the water is gradually drained off. The grain is ready for harvesting about the middle of January.

Harvesting.—The operations at harvest and the threshing are similar to those described for Krian.

Kelantan.

Almost the entire northern plain in Kelantan is devoted to the cultivation of padi, of which the State contains an area second only to that of Kedah, though from the point of view of production, it occupies only third place amongst other States and Settlements in Malaya.

Two distinct types of padi are cultivated, namely, wet padi or *padi chedongan* and dry padi, *padi tugalan*. This dry padi must not be confused with the dry or hill padi, *padi huma*, found in various parts of Malaya, as the methods of cultivation are distinct.

Wet Padi in Kelantan.

Water-Supply.—Irrigated areas form an insignificant percentage of the whole and the crop is therefore dependent on an adequate and well distributed rainfall during the monsoon. The fact that local soils are of a more porous character than those of other padi growing areas renders the crop more liable to damage by drought and, in addition, the people show very little natural aptitude in taking water from drains and streams, or in utilizing water to its best advantage when it is brought to their fields. A further point militating against high yields is that the State carries a very large stock of cattle and buffaloes for which little grazing accommodation exists; the stock grazes on the padi land during the dry season and, in addition to causing great damage to bunds and water courses, constitutes a very severe drain on the store of plant nutrients in the soil.

Soils.—The cultivation of padi is carried out on two main types of land, the most common of which is lighter in texture than soils usually planted with this crop, and is, moreover, completely dry and baked for six months of the year. The second soil type is entirely organic and occurs in a belt behind the coastal sand bank. Soil of this type is water-logged throughout the year and during the wet weather becomes a morass which trembles beneath one's feet and into which one sinks.

Cultivation.—The date for the commencement of cultivation depends on the efficacy or otherwise of the western rains on which the cultivators depend to soften the soil sufficiently to permit the plough to penetrate. Usually these rains commence in July. Preparation of the land and planting proceed from then until towards the end of November, the low-lying areas being completed first followed by the higher and drier areas, which naturally require a longer soaking before they can be brought to a fit condition for planting.

Where the nature of the land permits, the water is drained off and the fields ploughed and harrowed three times at intervals of ten days. Cultivation is to a depth of 4½ inches and the soil is reduced to a puddled condition. The final harrowing is usually done when the land is flooded.

On the organic types of soil ploughing is impossible, and cultivation is by means of cutting down the grass with a *tajak*. The cut grass is allowed to rot *in situ* and when the plants commence to grow once more the *tajak* is again brought into operation.

Nurseries.—The preparation of the nursery precedes the cultivation of the fields. Dry-land nurseries are used, being sited near the house and protected from cattle. The site for the nursery is ploughed and harrowed twice after which the seed is broadcast thinly over the bed and a final harrowing given to cover the seed. Seedlings are ready for transplanting in the field when they are 40 days' old, but if cultivation of the fields is late through unsuitable weather, transplanting is necessarily postponed and the seedlings may remain in the nursery for periods up to three months.

The seedlings are taken from the nursery, the roots cleared of all soil and tied in bundles. The bundles are set in water for twelve hours before the tops of the leaves are cut and transplanting carried out.

Transplanting is done entirely by hand, without the use of such an implement as the transplanter, *kuku kambing*. The normal spacing in the fields is 12 inches, but varies considerably even within individual plots.

After transplanting, depth of water is liable to fluctuation with rainfall, but when a heavy fall of rain occurs, a large proportion of the cultivators take the opportunity of opening bunds and draining off all water in an attempt to catch fish in traps inserted in the openings.

About a month after transplanting the crop may receive an application of *baja bakar*, a mixture of cow-dung, earth, coconut and arecanut leaves which is burnt before application. About two tea spoonfuls of this manure is placed at the base of each plant and appears to have a slightly beneficial effect on the crop.

Harvesting.—Weeding is not practised, and after manuring the crop is left until ripe when harvesting is effected ear by ear with the small knife held in the palm of the hand (in Kelantan known as *Ketam-an*). The ears are tied in bundles (*gemar*) and stored in the ear. Threshing is done by working the ears between the feet, and winnowing by tossing the threshed grain in shallow baskets.

Dry Padi in Kelantan (*Padi Tugalan*).

The land planted with dry padi falls into two groups, that habitually under the dry crop and that which may be utilized for either the wet or dry type. The latter forms but a small proportion of the whole and comprises the lower lying dry padi or *tugalan* lands, the choice of wet or dry padi for any particular year usually depending on the inclination of the cultivator. Generally speaking, the fields are

flat or slightly sloping and in the latter case wet padi land is found at the bottom of the slope, dry padi land over the main area and the intermediate or alternating type mentioned above in a narrow strip between the two.

Throughout the dry padi areas lots are divided and demarcated by bunds.

The soil throughout the dry padi lands is markedly homogeneous and, though occasional ridges of slightly sandy soil are found, a heavy loam predominates.

In view of the localized nature of the crop it is not surprising to find that there are only some twelve distinct varieties cultivated. The maturation periods of these varieties vary from 173 to 197 days and, though the majority can only be used as dry padi, there are some which can also be successfully planted on wet land.

The success or otherwise of the dry padi crop is dependent on a favourable monsoon. Dry padi calls for an amount of labour and care which not all cultivators are prepared to give and which is greatly in excess of that required to produce a crop of the wet type.

There is a comparatively dry season, which may extend from the middle of February until the end of May, but which varies in duration and severity. This dry season is followed by showery weather in July and August, the showers becoming more frequent until they reach a climax in the monsoon. During the dry season the land bakes so hard that the local plough with a rounded sole and sharp turn on the mould board is barely able to penetrate the soil and the small local cattle, which have to exist on the sparse grazing provided by baked padi fields are unable to drag the implement effectively.

In preparation for the crop the peasant commences ploughing at the end of June or early July when the land has been softened by rain but has dried out sufficiently to avoid any danger of puddling. The land is turned over to a depth of approximately two inches and in dry weather is subsequently harrowed down. The soil is then allowed to lie for a period of about 10 days when it is said to be *masak*. Should rain fall after ploughing, the furrows break down and harrowing is unnecessary. These operations are repeated twice more with appropriate interval between cultivations, the objects being to attain a depth of cultivation of about $3\frac{1}{2}$ inches and to kill weed growth. Finally, the land is ploughed and harrowed a fourth time and seed planted in rough lines by dibbling in on the same day; subsequent cultivation is confined to weeding which is performed at varying intervals by cutting down the grass with a short knife.

Throughout these operations from the preliminary ploughing to the last weeding the utmost care is taken to avoid puddling the land or packing it unduly.

If the crop is to be a success it is essential that the plants should be well established and some 12 to 18 inches in height before the land becomes waterlogged. If planting is delayed the plants do not become sufficiently developed before water commences to stand in puddles on the surface; they do not tiller, weeding cannot be sufficiently performed, and the crop is poor. On the other hand, once the plants are well established and all weeds removed, the crop is unharmed by an excess of water.

Harvesting Padi by means of *Tuai*.

As an important point in the cultivation of this crop is to avoid puddling the soil, it follows that weeding should be completed before showers become of daily occurrence; thus it is advisable that the actual planting be completed early in August. This, however, may be a matter of difficulty. If the dry season has been severe and protracted the peasant is unable to commence ploughing until the land has been thoroughly softened by rain and subsequently, owing to the shallow furrow turned by the plough, he has to plough four times to obtain sufficient depth of cultivation. The four ploughings, together with the periods between ploughings, retard planting, until, by the time the crop is ready for weeding, rain is of daily occurrence and weeding ineffectual, being actually harmful by causing puddling.

The necessity for four ploughings to achieve sufficient depth of cultivation, and also with the object of eradicating weeds is open to doubt, but this has been the custom for a very long time and the cultivators continue to follow the methods practised by their progenitors.

Trengganu.

Four types of padi are cultivated in the State namely—

(1) *Padi chedongan* — Wet transplanted padi.
(2) *Padi taboran* — Padi broadcast on dry land.
(3) *Padi tugalan* — Padi dibbled on dry land.
(4) *Padi huma* — Padi dibbled in on burnt off jungle land which is subsequently allowed to grow up in jungle.

The cultivation of wet padi in large areas is confined to Besut and Kuala Trengganu Districts. A few small native-built irrigation dams have been constructed although, for the most part, the crop depends for water on rainfall, and the yield, therefore, fluctuates from year to year. In both of these localities the crop appears to be well cultivated and cared for. In other districts, cultivation of wet padi is confined to small and isolated blocks in which there is a marked lack of collective effort and only a slight understanding of pest control. In certain areas the most elementary principles of cultivation and water control are not understood.

Padi tugalan, on the lines of the Kelantan dry padi, is not extensively planted and though a few well-cultivated plots are seen, the principles underlying the cultivation of this crop are not generally understood so that the correct procedure is often a matter of luck and the crop more variable than should normally be the case.

Padi taboran is grown on land suited to *padi tugal* and is planted either because the owner knows no alternative form of cultivation, or because he has too much land to plant and care for by the superior *tugal* method. After three ploughings and harrowings, the seed is broadcast and harrowed in and thereafter the crop is left to itself. Weeding is impossible and the padi becomes wholly or partially choked with grass. Seeding is too close to allow plants to develop properly and a great waste of seed occurs. This is an exceedingly wasteful form of cultivation

from every point of view, but particularly in relation to land which is planted for two years and fallowed for one or two seasons the crop at its best can only be a partial success and can never be economic.

Padi huma is grown extensively throughout the State, but especially so in the Jajahan Timor and Ulu Trengganu. The jungle is felled and burnt off after which either one or two crops of padi are removed, the land then being allowed to grow up in secondary jungle and the cultivator moving to a fresh site.

Malacca.

Two main types of padi areas may be defined; firstly, the large continuous stretches of flat land in the coastal belt; and secondly, the long and comparatively narrow valleys inland. The former seldom had irrigation facilities, but these are gradually being improved by the Drainage and Irrigation Department. The greater part of the coastal padi lands rely entirely on the retention by permanent solid earth bunds of rainfall and surface run-off from adjoining higher land. The latter are usually irrigated individually by small natural streams, or by small canals from Government-built dams.

During the month preceding the commencement of cultivation, the drainage and irrigation channels are cleared and repaired, and any undergrowth within or bordering the area, which is liable to harbour pests, is cleaned communally.

Nurseries.—On the completion of clearing work, the nursery plots are ploughed. These are "wet" nurseries, usually situated on slightly higher areas of the fields so that they are not subject to deep flooding in the event of heavy rain. After lying fallow for about one month, the plot is lightly raked, then again ploughed.

The final preparation takes place immediately before sowing the seed, and consists of a thorough raking, or raking followed by a third ploughing, according to the texture and weediness of the land. The aim is to produce a clean seed bed uniformly level and puddled to a depth of about 4 inches. Final levelling is done by dragging by hand a float over the surface. The plot is left for one or two days for the mud to settle, and all surface water is run off.

Subsequent operations of sowing the nursery follow those described under Province Wellesley and Penang, except that the germinated padi seed is sown in strips about 10 inches wide.

Cultivation.—The method of cultivation of the padi fields follows the general lines of that for the nurseries, but is less thorough. Two ploughings only are given, and the final raking carried on until no clods show above the surface of the water, which is usually about two or three inches deep, and the soil is sufficiently softened for easy transplanting. Between the first and second ploughing, the bunds which separate fields are trimmed and repaired where necessary.

The seedlings are transplanted after about 44 days, the roots cleared and steeped in a manurial paste prepared from a mixture of ashes, burnt and powdered bones and sea mud, or the bone ash is replaced by bat guano from Kedah or Perlis. The bundles of seedlings are stacked after treatment and kept for three days when bone ash is used and one day when guano is employed.

Transplanting is by hand, from 3 to 10 seedlings per "hill" spaced about 10 inches apart.

After transplanting nothing further requires to be done except weeding. Where the cultivation has been thorough and from 4 to 6 inches of water can be kept on the fields, weed growth is negligible. In most cases, a rough weeding, about two or three months after transplanting, suffices.

When possible, the water is drained off before harvest, and harvesting carried out before the crop is dead ripe to avoid loss of grain. The crop is harvested with the sickle, threshed in the field, winnowed and stored.

The stubble is burnt off at the first favourable opportunity after harvesting is completed.

Selangor.

The area under padi cultivation in Selangor can be divided into two divisions, namely the inland and coastal districts.

Dates of planting vary, for rainfall in the inland districts is greater than near the coast. Planting in the former commences in May and June and in the latter in October.

Cultivation.—The land covered by about 3 inches of water is cultivated with the *tajak,* or dug with a *chankol.* The grass is drawn into small heaps (*gulong*) and after 40 days drawn to the bunds. Grass which subsequently grows is removed by hand and forced into the soil. The soil is puddled and levelled by treading or with the *tajak.*

Weeding commences when the seedlings have been transplanted for about one month.

Nurseries.—Nurseries are prepared on dry land, fenced and the newly-planted seed protected from birds by covering it with cut *lalang* grass.

Transplanting.—Transplanting commences when the seedlings are 45 days' old. Some cultivators remove the seedlings the day before transplanting, others take them straight from the nursery to the field. The top of the leaves of seedlings are cut off before transplanting. Transplanting is performed by hand.

Harvesting.—Harvesting is usually performed ear by ear with the small knife (known in Selangor as *tuai*). Threshing is done by treading, and for winnowing, the padi is placed in a tray made of bamboo (*niru*) and shaken backwards and forwards to separate the empty grains, and winnowed in the breeze.

Storage of Padi.—Various methods of storage of padi are practised in Malaya, but in many areas, bins made from the bark of the jungle tree and called *kepok* are popular.

Negri Sembilan.

The padi-producing areas of Negri Sembilan are confined to inland valleys, formed principally by the main range which traverses the State. These valleys, in many cases, are of no considerable breadth and are therefore liable to short periods of inundation during spells of heavy rainfall.

Water Supply.—Irrigation was effected almost entirely by the native brushwood dam, distribution of water being by a ditch line. Permanent dams have now been erected by the Government in many places to replace the brushwood dams which were easily destroyed by floods and caused considerable damage to the banks of the rivers.

In some areas water wheels, made mostly of bamboo and rotan, are used for lifting water from rivers to the higher level of adjacent fields.

Cultivation.—Preparation of sawahs commences in April-May when the weeds are cut with the *tajak*. The vegetation so cut is allowed to remain on the land for a period up to 5 weeks, during which time it is an advantage to have a plentiful supply of water to hasten the decomposition of the mass and retard fresh growth. Subsequent cultivation is determined by the nature of the soil and quantity of water available. Deep soil which has been under cultivation for some years can, providing an ample supply of water is available, be worked over by a roller, (*pengilling*) which consists of a cylindrical piece of hard wood some 4 feet long and 7 inches in diameter, into which is secured four transverse rows of rectangular pieces of wood about 4 inches long and 2 to 3 inches wide, giving the whole the appearance of a paddle wheel. This implement is very efficient, incorporating the vegetation into the soil, and producing a well-puddled condition suitable for the reception of the seedlings.

The desired result may also be obtained by agitating the soil to a sufficient depth by means of the heavy hoe (*chankol*) or the *tajak*, and treading in by foot, either manual or animal (*melunyah*). This operation is occasionally assisted by the use of a light rake-like implement (*sikat*), drawn by a buffalo. Shallow soil or land inadequately watered is similarly treated, the work in this case requiring the exercise of much more energy before the desired effect is obtained.

Immediately before planting out, any vegetation which has not been turned into the soil is either removed to the bunds, or worked into the soil by foot.

The use of ploughs for the initial breaking of the land is very unusual.

Nurseries.—The nurseries are laid down in May and June. Dry land nurseries in a shady sheltered situation are probably the most popular, although wet nurseries are not uncommon. The seed is soaked before planting, the nursery protected from birds by leaves and from buffaloes by fencing. Transplantation is usually between 40 and 45 days after sowing.

Transplanting.—Immediately before transplanting, surplus water is drawn from the prepared fields and is maintained in this condition for about a week after planting, by which time the plants are fairly established, when water supply is increased.

The seedlings are drawn from the nursery, the roots washed, leaves cut back, and the seedlings kept for a day before planting. Planting in the field is performed by hand, generally by women, from 3 to 5 seedlings per "hill," "hills" being spaced for 15 to 20 inches apart depending on the fertility of the soil.

Weeding follows a month or so later, but efficient weeding is often neglected.

Roller.

Rake-Harrow (*Sikat*).

Harvesting and Threshing, Malacca.

Padi Storage Bins made of Plaited Split Bamboo.

Harvesting.—Usually the crop is harvested with the small hand knife (*tuai*) though in recent years the *sabit* or sickle has been introduced in a few localities. The ears are cut with the right hand and passed to the left when they are collected into a small bundle. These bundles (*gemalan*) are dried. Threshing is done by trampling with bare feet on a raised platform composed of bamboo slats. The grain falls through the interstices and is collected on a mat below.

Where the sickle is used, threshing is performed by beating the grain into a tub.

Winnowing is performed by hand, a tapering tray (*niru*) being employed. By shaking backwards and forwards a large proportion of the chaff is separated, worked to the edge of the tray and discarded. The grain is then allowed to fall onto a mat at a time when a good breeze is blowing. An alternative method, known as *tampi*, by which the separation of the grain from the chaff is made with a bamboo or rotan sieve is also used, but is considered laborious.

Storage.—The usual form of store is the *kepok*. This is a cylindrical bin or tun which, in Negri Sembilan, is made from the bark of a jungle tree called *kepong* (apparently a species of *Shorea*). Two such bins, one large and one small, are commonly housed in a single raised shed (*rumah kepok*) the roof of which is made of *atap* and the walls of split bamboo. The smaller bin is used for storing glutinous rice (*pulut*) and the larger bin for the ordinary hard rice. They are made in all sizes, frequently being about 4 feet in height and 12 feet in diameter; such a bin would have a capacity of about 500 gallons. A disadvantage of the larger bins is that when the level of the padi is getting low, the extraction of further supplies for household use is troublesome.

The type of store known in the Northern States as *jelapang* is becoming popular in some localities, particularly among Sumatra Malays, being known as *rumah padi*. It is a self-contained rectangular store surmounted by an *atap* span roof. The walls are of wood or other local material. The top is closed and the grain is extracted by a sectional door, the segments of which can be made to slide out singly as the level of the grain gets lower. This door is locked at night.

Pahang.

Of the Federated Malay States, the practices followed in padi cultivation in Pahang are the most primitive of any of the four States.

Soils.—In the western portion of Pahang the soils utilized for wet padi cultivation are usually heavy clay, but in the eastern districts, more especially near the coast, soils are of a very light nature and invariably contain a very much larger percentage of both fine and coarse sand. In some parts of the coastal areas low-lying peaty soils are cultivated but only in the case when the peat is comparatively shallow. The principal drawback to the sandy soils of Pahang lies not so much in poor fertility as in lack of water-holding capacity, a serious objection under local conditions, because controlled water schemes are few.

Climate.—Rainfall varies from District to District in so far as total precipitation is concerned, but the wet months in the western Districts coincide with those of the

east, with the exception of the month of February which in inland Districts is usually exceptionally dry.

Planting Seasons.—Three separate planting seasons are recognized in Pahang, namely:—riverine areas, March/December; western Districts, July/February, coastal areas, June/March.

Owing to the frequent floods in December and January, the sowing of nurseries for "wet" padi usually takes place towards the end of February or early March, which allows of the crop being harvested by the middle of December before any real danger of losses occurring through floods.

Preparations for planting in the western Districts are slightly later as the flood question is less serious and also the damage from drought during the drier months is not so severe, as in most instances the water supply is supplemented by small irrigation schemes. Harvesting takes place towards the end of December and early January.

In the coastal areas the season is much later as, due to the very flat nature of this region, there is little or no danger of damage resulting from floods, whilst the dry months of June and July can be avoided. Nurseries are usually sown towards the end of June and the seedlings ready for transplanting at the commencement of the rains, which supply the whole of water requirements. Harvest commences towards the end of March or early April when conditions are favourable.

Nurseries.—Nurseries to supply seedlings for any types of "wet" cultivation are usually situated on dry land, although the recent introduction of several types of wet nursery has been noted in some areas. Secondary jungle land is usually selected, felled and burnt shortly before sowing the seed. A few larger trees are usually left to afford light shade. The seed, previously soaked in water, is broadcast after the soil has been lightly cultivated, the area then raked to bury the seed. A small amount of weeding is done later if necessary and in the event of dry weather the beds may be watered. Such nurseries are known as *semai darat*. The seed rate is about 4 to 5 gallons for every acre to be planted.

The seedlings remain in the nursery for 6 to 7 weeks, or much longer if weather is unsuitable for transplanting.

Cultivation.—Broadly speaking, there are only two types of land used for "wet" padi cultivation, referred to as *paya* (swamp) and *paya sawah* (irrigable). In *paya* cultivation the land usually comprises low-lying and swampy areas, bordered by low hills and with or without a stream passing through the land. A *paya* which relies entirely on local rainfall is referred to as *paya takong*, but should a small stream exist, capable of supplying a portion of the water supply, it is then referred to as *paya anak sungei*.

Paya sawah more closely approaches the type of cultivation met with in the western States, and comprises flat land, not necessarily of a swampy nature. In a few instances, slightly undulating land is cultivated by terracing. In almost all cases *paya sawah* is equipped with some form of water supply, although it may be insufficient for the whole area cultivated and reliance has to be placed on a portion of the water requirements being supplied by local rainfall.

The cultural methods practised and the yields obtained from *paya sawah* are superior to the *paya* cultivation.

The larger areas of "wet" cultivation comprise *paya*, mostly alienated in the riverine area, whilst *paya sawah* is confined almost entirely to the western portion of the State.

The methods of cultivation followed in the *paya sawah* are very similar to those found in Negri Sembilan. The methods used in the *paya* and in the coastal areas are various, and are somewhat similar to those in Trengganu.

There are no fewer than four system of cultivation known in the coastal areas, namely: *paya chedong, paya tabor, paya simbah,* all of which may be classed as "wet" cultivation, and *padi tungal* or *ladang* under "dry" cultivation.

Chedong literally means to transplant; hence any padi land on which transplanting is practised is called *paya chedong*. Of the three wet methods in vogue the *chedong* method is undoubtedly the best. It is commonly practised on localized areas chiefly on the coast where most of the planters have land held under Temporary Occupation Licence. *Tugal* is the common system practised in new clearings on hilly lands. There is very little area under this form of cultivation at present.

Paya Chedong.—The main operation in the preparation of this type of padi land is to cut down all the standing grass with a *parang* or cutlass (*merembas*) and allow it to rot *in situ* for about 3 to 4 weeks. Prior to the big flood in 1927 when there were plenty of buffaloes, the *paya* was ploughed but at present such a practice is never done. In places where the soil is hard a *chankol* or *tajak* is occasionally used and, in some cases, the buffaloes are employed to trample the grass on the *paya* and puddle the soil. This is the only form of tillage of the soil before planting.

The construction of bunds is only casually done in a few *paya*. Small dams and such other minor works are usually erected with the financial assistance of Government, the owners being made to carry out the necessary work.

Paya Tabor.—The preparation of the land is practically the same as detailed above but probably with less attention to details. The area is not planted with seedlings raised in a nursery but is merely broadcast with seeds which have been immersed in water for about 2 nights. The area under this form of cultivation is fairly small, its place being superseded by *paya simbah*—a most haphazard sort of cultivation requiring the least minimum efforts.

Paya Simbah.—The jungle or secondary jungle growth is first felled, cleared and burnt during the dry season. Frequently the burning is unsatisfactorily done. At the commencement of the rainy season the wet seed is broadcast on to the semi-wet *paya* and then left entirely to the mercy of the weather till harvest time. Cultivation, beyond perhaps an occasional weeding, is never done. Usually 5 to 7 gallons of seed are required to plant up an acre.

This wasteful method of padi planting owes its origin to the Sakai, a great number of whom are found in the upper reaches of the main rivers on the coast. After 2 or 3 successive plantings the land is abandoned and new areas are acquired for the same purpose.

Tugal or Ladang.—This form of dry padi cultivation is commonly practised throughout the Malay Peninsula on new land under virgin jungle. After felling and burning the jungle during the dry season the seed is dibbled into the ground, 6 to 12 seeds per hole.

Seeding rate per acre is about 4 to 5 gantangs. After 2 or 3 croppings are obtained the land is then planted with permanent crops, usually fruits or coconuts.

Harvesting.—In harvesting the ordinary *pisau tuai* is used. In several *paya* harvesting is done in co-operation, but when there is a fairly good crop outside labour (usually Malays from the neighbouring villages who have either lost their own crops or failed to plant) is employed on the 1/5 or 1/3 system depending on the condition of the crop to be harvested.

The crop thus harvested in ear form is then threshed and winnowed by means of a *nyiru* either directly in the field or after it is collected and brought to the house. The cleaned padi is well dried in the sun before storage. The common receptacles used are gunny bags, but if the crop is fairly large bins (*kepok*) made of wood or strong bark are specially prepared for storing purposes. The grain is taken out whenever required for home consumption. Any surplus (which is unfortunately very rare) is immediately sold to the Chinese shops in towns and, in the neighbourhood of Temerloh, to the Government Rice Mill erected in 1935.

After harvesting the straw is merely left standing on the field to rot. The stubble is never burnt except in a very special case. In many places buffaloes and other animals are allowed to roam about and graze on the *paya*.

Johore.

Rice production has not yet attained significant proportions in Johore. Investigations of extensive potential areas are now being undertaken with a view to assessing the dependence of the State upon importations.

Production is largely dependent upon the market conditions for other important economic staples such as rubber and copra. During periods of depression the cultivated area has reached an aggregate of 17,000 acres, largely as the result of opening and planting small swamp areas, often unsuitable for the purpose and from which negligible crops are obtained. Under normal conditions production is confined to some 6,000 acres of old established *sawah.*

The principal producing areas are situated in inland valleys in the northern districts of the State, of which Segamat is the centre. Soil conditions are eminently suited to padi cultivation but the absence of facilities for adequate water control and the complex weather conditions prevailing in these localities mitigate against economic production except during favourable seasons.

In the areas situated in the Segamat District a March/November season is observed owing to the possibilities of flood damage near the end of the year. This practice however often exposes the newly planted crop to severe drought conditions except in the few areas where irrigation is possible. Methods of cultivation and harvesting closely follow those employed in Negri Sembilan and Malacca, the use

of buffalo-drawn implements having become increasingly popular during recent years. In these areas a padi planting tradition has become established, and the various operations associated with cultivation are well performed.

In the well established but limited areas near Tangkak where irrigation facilities exist the normal July/February season of the west coast is followed, methods of cultivation and management being almost identical with those of Negri Sembilan. Upkeep, however, is often neglected, and losses from pests consequently large.

In other localities, principally along the east and west coast, small isolated areas are cultivated during a March/November season. In these water control facilities are either non-existent or inadequate, cultivation and maintenance receive insufficient attention and pest damage is normally severe.

Dry padi (*padi huma*). which at one time was extensively cultivated, is now concentrated in a limited area of small importance in the Muar District.

Brunei.

The usual method of cultivation is a primitive one whereby buffaloes are driven on to the land after the off-season growth has been cut down, dry nurseries are sown, and the plants are transplanted when about 40 days old. The maintenance of a covering of water over the surface of the land after planting, the necessity for strict adherence to planting dates so as to minimize pest damage, the elimination of water after flowering, and the selection of the most suitable types of soil, all of which are usually understood and widely practised in the Malay Peninsula, are comparatively unknown in Brunei.

It is perhaps worthy of note that in Brunei all wet padi land is known as *paya* land, *i.e.* swamp land. The word *sawah,* commonly used in the Peninsula for wet padi areas, is practically unknown in Brunei. The use of the word *paya* is interesting inasmuch as it affords comparison with parts of Pahang, where this word is used to describe deep swampy land situated in the low-lying parts of valleys and where, presumably, soil conditions are similar to those obtaining in Brunei. It is also note-worthy that buffaloes are used in the preparation of the land for padi planting in Brunei, as in Pahang.

Labuan.

The methods of cultivation are substantially the same as those commonly employed in Brunei, *i.e.* the soil, when covered with a thin layer of water, is trampled by buffaloes and all weeds are trodden in. Dry nurseries are usually sown and the plants are transplanted when about 44 days old. Little subsequent attention is paid to the crop until harvest time. In Labuan weeding is seldom practised, this being a departure from the Brunei custom. The soil is mostly of a heavy clay nature, capable of producing excellent crops with a controlled water supply, and the use of implements such as the buffalo plough is possible.

Aquatic weeds are common in some areas, causing a reduction in the vigour and yield of the crop. As weeding is seldom practised, little or no attempt to control the growth of these weeds is made by padi growers.

CONDITIONS ON RUBBER SMALL HOLDINGS IN MALAYA

4th Quarter, 1938.

Prepared by the Economics Branch of the Department of Agriculture, S.S. and F.M.S., in collaboration with the Field Branch of the Department.

Rainfall.

With the exception of Malacca which experienced heavy rain, the weather throughout the country in October was unusually dry and hot, until the last week of the month when rainy weather set in on the east side of the main range and in north Johore. November was a dry month except on the east, where heavy rains continued until the fourth week. Malacca again experienced heavy rains throughout December, but elsewhere dry and hot weather persisted until Christmas when, and until the end of the year, rainfall was heavy, except in Johore where dry weather was experienced throughout the month.

Prices.

As shown in Tables I and II, the price of rubber remained fairly steady throughout the quarter, at around the level reached at the end of the third quarter.

A rise in coupon value took place in October, on the announcement of the quota rate. In most parts of the country coupon values reached a higher level than at any time during the preceding quarter. The average price of coupons was about $28 per picul, although in some districts it was as high as $30 per picul. Rubber not covered by coupons was correspondingly low, from $5 to $6 per picul being usual. It is generally considered uneconomic to tap if the price of the uncouponed product falls below $6 per picul; this price-factor at least partially accounts for the further increase of areas which were out of tapping.

Production.

The total Malayan production of rubber in 1938 amounted to 360,898 tons, of which 114,678 tons (32 per cent.) were produced on small holdings. Of the total area planted with rubber 1,275,822 acres (39 per cent.) is in areas of less than 100 acres. These figures reflect the very high out-of-tapping figures for small holdings, a proportion of the coupons being sold and used to cover the produce of the larger estates. Quarterly production on small holdings is shown in Table III.

Quality of Rubber.

The greater part of the rubber produced on small holdings is sold as unsmoked sheet. Despite the fact that a cheap smoke house has been devised and that considerable propaganda has been directed to make it known throughout the country, there is a general disinclination to produce good quality rubber. Here

Table I.

Highest and Lowest Rubber Prices Paid by Local Rubber Dealers.

(In Straits dollars per picul of 133 1/3 lbs.)

4th Quarter 1938.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
			OCTOBER					
Smoked sheet	37.00-32.00	37.50-26.00	37.00-34.00	37.00-31.00	36.50-31.50	37.50-32.00	37.80-26.00	37.00-31.50
Unsmoked sheet	36.00-31.00	35.10-29.00	36.00-30.00	35.50-29.00	35.10-30.50	35.50-30.00	34.00-25.50	35.50-30.00
Scrap	32.50-24.00	28.00-26.00	30.00-28.00	—	—	30.00-25.00	30.50-27.00	32.25-27.00
			NOVEMBER					
Smoked sheet	37.00-33.00	36.80-31.50	37.00-32.00	36.50-32.00	36.20-31.00	35.50-34.50	36.50-32.50	36.50-31.00
Unsmoked sheet	36.00-32.00	35.40-29.00	36.10-30.00	36.00-31.50	35.30-30.50	34.00-32.50	34.50-28.50	36.00-29.50
Scrap	32.00-23.00	27.00-25.00	30.00-26.00	—	—	30.00-26.50	30.00-24.00	30.50-27.00
			DECEMBER					
Smoked sheet	37.00-33.00	37.00-30.50	36.00-32.00	35.60-32.00	35.60-32.00	36.50-34.50	35.50-32.00	35.50-31.00
Unsmoked sheet	36.00-31.00	34.50-29.00	35.75-30.00	34.60-31.00	32.30-30.00	35.00-32.50	33.00-29.50	34.50-30.00
Scrap	29.00-23.50	26.00-24.00	28.50-27.00	—	—	29.50-28.00	29.00-26.00	29.50-26.00

Table II.

Mean of Highest and Lowest Rubber Prices Paid by Local Dealers at a number of Centres in each State.

(In Straits dollars per picul of 133 1/3 lbs.)

4th Quarter 1938.

	Penang	Perak	Selangor	Negri Sembilan	Pahang	Malacca	Kedah	Johore
				OCTOBER				
Smoked sheet	36.50-34.00	35.78-31.95	35.60-34.30	36.43-33.88	35.73-33.22	36.50-34.83	36.08-30.38	35.25-32.95
Unsmoked sheet	35.38-33.25	33.48-29.70	83.90-31.90	35.20-31.80	33.34-31.62	35.00-33.17	34.00-30.15	34.36-31.59
Scrap	29.38-27.88	28.00-26.00	30.00-28.00	—	—	28.50-27.33	29.83-25.67	29.89-28.74
				NOVEMBER				
Smoked sheet	36.50-33.00	35.75-32.97	35.18-33.45	35.91-33.45	34.55-31.67	35.40-34.83	35.75-33.75	34.51-32.61
Unsmoked sheet	35.25-32.38	33.31-30.89	34.12-31.70	34.80-32.30	33.33-31.00	33.83-32.83	33.50-31.50	33.86-31.40
Scrap	29.25-26.00	27.00-25.00	30.00-26.00	—	—	28.67-27.83	29.50-26.50	29.37-27.96
				DECEMBER				
Smoked sheet	36.70-33.50	35.12-32.91	34.87-33.61	34.74-33.14	33.94-32.64	36.13-34.67	34.75-32.88	33.85-32.61
Unsmoked sheet	25.38-32.25	33.31-30.90	33.55-31.15	33.72-31.84	31.27-30.89	34.50-33.17	32.25-30.33	33.26-31.41
Scrap	28.00-26.33	26.00-24.00	28.50-27.00	—	—	29.17-28.17	28.33-26.67	29.06-27.91

Table III.
Production of Rubber on Small Holdings.
(in tons)

	Total 1937	1st Quarter 1938	2nd Quarter 1938	3rd Quarter 1938	4th Quarter 1938	Total 1938
Federated Malay State ...	91,134	17,967	15,683	10,591	10,089	54,330
Unfederated Malay States ...	80,605	16,749	14,039	10,639	9,015	50,442
Straits Settlements ...	17,097	3,298	2,759	1,894	1,955	9,906
TOTAL MALAYA ...	188,836	38,014	32,481	23,124	21,059	114,678

and there an enterprising owner of rubber land erects a smoke house, but reports from almost all parts of the country are to the effect that smoke-houses are standing idle.

The main reason for this discouraging state of affairs is that the dealers to whom the produce is usually sold are generally in a small way of business and consequently carry out no grading before selling to large dealers. The margin between smoked and unsmoked sheet is therefore narrow, usually between $1 and $2 per picul. The basis of purchase is to make a cut of 8 to 10 per cent. for unsmoked sheet and to add a charge of 50 cents per picul for estimated cost of smoking.

Efforts are now being made in one or two districts to induce groups of small holders to bulk their produce for sale to dealers in a large way of business who are prepared to grade the consignment and pay cash down on the graded product. Experimental sales of this description have been encouraging and it may be possible by the establishment of such a system for the small producer to be more independent of the village dealer and thus obtain a better price for his product.

In many districts scrap rubber has been unsaleable.

The practice of selling rubber latex to dealers in place of prepared sheets has gained in popularity in two areas in Johore. The latex is reported to have been sold at 18 cents per 10 kati (13 1/3 lbs.). In parts of Johore, also, it is reported that the practice of selling rubber to unlicensed Chinese village shopkeepers continues, but in certain areas where this was usual, small-holders are now disposing their stock to licensed dealers from whom better prices are obtained.

General Condition of Holdings.

Reports from most States mention improvements in the general upkeep of holdings, and for this improvement the propaganda work of the Asiatic Rubber Instructors is partly responsible. Improvement work is frequently more in evid-

Table IV.

Estimated Acreage of Tappable Rubber which was out of Tapping on Holdings of less than 100 Acres at the end of December, 1938.

PERAK				SELANGOR				NEGRI SEMBILAN				PAHANG			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Batang Padang	36,187	8,700	24	Klang	16,143	7,300	45	Seremban	23,639	19,900	84	Raub	10,534	6,600	63
Kinta	38,874	5,400	14	Kuala Langat	23,881	7,200	30	Tampin	21,896	17,300	79	Kuala Lipis	15,457	2,200	14
Kuala Kangsar	92,166	9,900	65	Ulu Langat	45,012	14,000	31	Kuala Pilah	31,832	16,900	53	Bentong	12,224	2,400	20
Upper Perak	15,590	7,900	51	Ulu Selangor	31,463	12,300	39	Jelebu	9,097	2,500	28	Other Districts†	40,373	13,500	29
Larut & Selam	43,132	10,100	23	Kuala Lumpur†	20,277	7,100	35	Port Dickson	11,133	9,200	83				
Krian	9,408	7,200	77	Kuala Selangor†	8,417	2,900	35								
Lower Perak*	26,735	17,400	65												
Dindings	9,873	7,000	78												
	271,965	123,600	45		145,193	50,800	35		97,597	65,800	67		84,588	24,700	29

MALACCA				PENANG & P. WELLESLEY				SINGAPORE			
District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage	District	Total Tappable area	Total area untapped	Percentage
Central	14,093	9,700	69	North	3,549	1,300	38	Singapore	20,115	800	4
Alor Gajah	30,838	15,700	51	Central	10,785	4,800	45				
Jasin	25,286	6,100	24	South	8,936	7,100	80				
				Penang	15,822	600	4				
	70,217	31,500	45		39,092	13,800	35		20,115	800	4

JOHORE	350,007	75,500	21
KEDAH	102,126	42,900	42
PERLIS	2,916	29,500	36
KELANTAN & ‡	49,133		
TRENGGANU	29,836		

The percentage of areas out of tapping in September, 1938, was as follows:—Perak 40, Selangor 43, Negri Sembilan 65, Pahang 39, Malacca 41, Penang and Province Wellesley 34, Singapore 4, Johore 23, Kedah 27.

* Estimated from percentage for Kuala Kangsar.

†Estimated from percentage for other Districts in the State.

‡Estimated from percentage for rest of Malaya.

ence towards the end of a quarter, the object being to obtain an increased coupon allowance. There is little further improvement in tapping, but the high proportion of trees which are rested ensures satisfactory bark renewal. Sanitation on many holdings leaves much to be desired.

Danger of soil erosion calls for little comment, as the soil on most holdings is protected by a cover of undergrowth. On some clean-weeded Chinese holdings, however, damage by erosion is evident, and on the hilly lands in part of Pahang there is loss of soil. New alienations in Pahang carry special conditions providing for proper measures to prevent erosion.

"Wintering" was well advanced in Penang at the end of the quarter, and had commenced in Province Wellesley.

Tapping.

There was a slight increase over the previous quarter in the area of tappable rubber untapped. At the end of the quarter it was estimated that 36.4 per cent. of small holdings was out of tapping as compared with 36.0 per cent. at the end of the previous quarter.

Tables IV and V tabulate the results of the quarterly survey and provide a comparison with the previous quarter and last year.

Table V.

Comparisons of Areas of Rubber Small Holdings Out of Tapping.

	December, 1937		September, 1938		December, 1938	
	Acres	Percentage	Acres	Percentage	Acres	Percentage
F.M.S. ...	114,400	19.1	274,800	45.9	264,900	44.2
S.S. ...	13,100	10.1	42,800	33.0	46,100	35.6
U.M.S. ...	74,300	13.9	137,600	25.7	147,900	27.7
Malaya ...	201,800	16.0	455,200	36.0	458,900	36.4

Planting.

Interest has quickened in taking advantage of the opportunity for planting additional areas of rubber. In consequence, share certificates which in the third quarter dropped in value to about 80 cents have in many parts of the country increased in value up to $1.50. Each share certificate gives the right to plant 1/20 acre of rubber trees.

In many cases small holders who contemplate planting are anxious to secure high quality budding material. At a number of Agricultural Stations, therefore, nurseries are being laid down for multiplying suitable clones of budwood for sale at cost price. It is anticipated that budwood from these Stations will be available in 1940.

Replanting of old areas is seen, generally on the medium-size holdings owned by Chinese and Chettiars who have made arrangements to plant budded rubber. The total area thus replanted is unknown, but cannot be large.

Pests and Diseases.

The only disease which calls for special comment is Mouldy Rot (*Ceratostomella fimbriata*) which was more evident in districts where rainfall was plentiful. The average small-holder is beginning to realize the importance of prompt and correct treatment, as is evidenced in the increased sales of approved fungicides by the Department and by shopkeepers. In Negri Sembilan and Malacca, however, small-holders are prone to use tar for the treatment of this disease.

Root diseases are reported from various parts of the country but nowhere was any serious outbreak reported.

Cockchafers were reported as causing damage in Negri Sembilan and in Lower Perak.

Economic Position of Small Holders.

The economic position of small holders has shown no improvement during the quarter and in certain areas has further deteriorated. The decrease in the area tapped has resulted in an increase of unemployment amongst tappers. The continued low price of rubber, coupled with the restriction of output has proved a strain on the poorer small-holders, who now seek other employment to augment their incomes.

QUIT RENTS ON COCONUT AND OIL PALM LANDS.

The Federated Malay States Government has decided that the concessions in the matter of the payment of rent on coconut and oil palm lands which have been in force during 1937 and 1938 shall be extended till the end of 1939. The Government, however, reserves to itself the right to refuse any further extension of the concession beyond the end of 1939.

The concessions under reference are as follows:—

(i) Coconut Lands. In the case of lands exceeding 10 acres in area—

(a) the rent on planted areas already enjoying the rebate for land cultivated with coconuts under the Land Rules and paying $2 an acre will be reduced to $1 per acre;

(b) unplanted area will also pay $1 per acre only.

In case of lands not exceeding 10 acres in area, the effect of the concession will be to reduce the rent, which is in the majority of cases less than $2 per acre, by half.

(ii) Oil Palm Lands. A rebate will be given of 50 per cent. of the rent rent payable with a minimum of $1 per acre on planted and unplanted areas.

Applications for either of these concessions should be made to the Collector of Land Revenue of the District in which the land is situated. The question of eligibility of applicants for the concession is a matter for the discretion of the State authorities.

CONTROL BOARD OF PINEAPPLE PACKERS.

The inaugural General Meeting of the Central Board of Pineapple Packers was held in Singapore on 6th February, 1939, and was attended by all packers or their representatives, representatives of the Pineapple Growers' Association, Singapore Chamber of Commerce and of the three Governments concerned, *viz.* the Straits Settlements, Selangor and Johore.

The primary object of the Association is to improve conditions in this important industry by fixing selling prices of the finished product and by fixing also the quantity of pines to be canned in any one season, thus eliminating the cut-throat competition which in the past has been a major factor in depressing the price. One of the features of the scheme is the enforcement of a stated price for pines at factory, which is dependent upon the selling price of the canned product.

Under the rules of the Board, no decision on matters affecting growers or exporters can be taken until representatives of these two branches of the industry have had an opportunity of expressing their opinions on the proposal, and all discussions are subject to the consent of the senior of the Government officers present. There are, at present, two Government officers on the Board, *viz.* the Adviser on Agriculture, nominated by the Colony and Selangor, and the Senior Agricultural Officer, Johore, nominated by Johore.

Departmental.

FROM THE DISTRICTS.

Compiled by the Chief Field Officer from Monthly Reports of Agricultural Officers.

January, 1939.

The Weather.

In the north-western areas of the Peninsula, including Krian, dry weather conditions, normal for this season of the year, were experienced. Over the remainder of Perak, Selangor and Negri Sembilan ample rainfall was recorded, particularly in North Perak, where heavy rainfall in the hills caused a certain amount of flooding.

Conditions in Kelantan, where exceptionally heavy rains occurred, were abnormal. The highest rainfall for the month was recorded at Pasir Puteh (58.14 inches) and the lowest at Tumpat (30.62 inches). In this State the average rainfall for January ranges between 9.59 and 13.9 inches. Most of the rain fell during the first half of the month and serious floods occurred in a number of localities, Pasir Puteh being the worst affected.

In Pahang rainfall was well above average and the Pahang River rose considerably above its normal level, but flooding has not yet been reported.

Conditions varied throughout Johore. In the east coast areas rainfall was above average; in the south and west precipitation was normal, while in the northern areas conditions were hot and dry.

Crop Reports.

Rubber.—During the first half of the month prices showed a tendency to advance but weakened subsequently and closed at the former level.

With the advent of dry weather conditions wintering has commenced in parts of the north-western areas. It has been reported that as a result of the widespread sale of coupons in the Kuala Muda District of Kedah, over 300 tappers have been thrown out of employment.

Small holding producers in Perak are evincing a keen interest in new planting and replanting. A group from the Sitiawan District approached the Department with a view to purchasing a minimum of 20,000 budded stumps. In view of the difficulty of preparing budded material in very large quantities, action has been taken to demonstrate the technique of budding and to arrange for the distribution of suitable clonal material from Departmental nurseries already established for use on seedlings which the small-holders have decided to raise themselves. It is understood that applications to plant and replant a considerable aggregate area have been received at Land Offices, and it appears probable that a large proportion of this area will be budded. In some areas small-holders are reported to have purchased clonal seed.

A considerable number of applications for conversion of title to permit the planting of rubber have been made, particularly in respect of areas in Pahang at present cultivated under dry padi.

In all parts of the country the value of share certificates has increased considerably. In Pahang prices have reached $60 per acre, in Selangor $55 to $60 and Johore $46 to $57.

The abandonment of the use of the improved type of small smoke cabinets which has been progressively reported from other western States has now spread to South Pahang owing to the small premium paid by dealers for good quality smoked sheet.

Padi.—In Kedah and Kelantan harvesting has now commenced, and crop prospects appear to be good except in late planted areas. A commencement has been made also in some areas in Penang and Province Wellesley where the crop promises to exceed earlier expectations. In Negri Sembilan the harvesting of an average crop is now well advanced.

In the Panchang Bedena area of Selangor the appearance of the crop is now promising and water supplies are ample. During the month transplanting was undertaken on some of the higher areas which were previously dry, but sufficient seedlings to complete the planting were not available owing to the advanced age of the nursery material. It is estimated that the planted area for the current season is approximately 9,800 acres.

About one quarter of the 12th mile Tanjong Karang area is now carrying a crop and has sufficient water supplies. Further planting is not possible as nurseries, established earlier in the season in anticipation of a sufficient water supply, have died out.

In the Kuala Lumpur District preparations are being made for sowing nurseries in February. There is now a complete overlap of seasons in different parts of the State.

Many small power-driven rice mills continue to be erected in the main producing areas throughout the country. A recently completed list of such mills in Kedah shows a total of 37 as compared with 16 at the end of the previous year. Machines with a capacity in excess of 50 bags per day had previously been popular but recently mills with a small output have been gaining favour.

One new rice mill has been erected in Perak and one in Province Wellesley. A Malay Rice Millers' Association has also been formed, the principal objects being to prevent unnecessary competition and to exchange information on the marketing of milled products. Small mills in Perak have been idle during the month owing to the shortage of rice.

Fish.—During the draining of the padi fields in Perak, cultivators have been busy trapping fish. The season's catch is expected to be similar to that of the previous year, when, in spite of reports of small catches, exports of dried fish reached a total of 7,289 piculs, which was about double the average for the previous five years. Rice cultivators in these areas derive a large part of their income from the sale of this commodity.

Pineapples.—The production of pineapples for canning in Selangor fell off rapidly during the month. In Johore the fruit season ended early in the month and most factories ceased operating.

Fruit.—From Perak it is reported that considerable interest is still being maintained by cultivators in budded fruit trees. It is hoped that soon stocks will be sufficient to meet the greater part of this demand, but it will be some time before sufficient material will be available to supply individuals who require to plant 3 or 4 acres. Therefore, such applicants are being advised to plant their own nurseries for budding.

Exports of bananas from Negri Sembilan during January totalled 14,045 piculs: 13,005 piculs came from Jelebu and 1,040 piculs from Seremban.

In Singapore sugar cane is being grown as a special crop in several districts, in preparation for the Chinese New Year celebrations. The usual variety grown is the large yellow cane known as "Bourbon." Large quantities of cane for eating are imported annually from Hongkong and China at this time of the year.

Vegetables.—The Agricultural Officer, Singapore, reports that owing to the large demand for vegetables by the increasing Services and civilian staffs in the Changi and Seletar neighbourhoods, supplies from these areas, and even further afield, are insufficient; consequently less and less locally produced vegetables are available for Singapore markets, thus necessitating increased imports from the Netherlands Indies and Johore.

Considerable reorganization at this Station has recently been carried out. The new fruit area will contain only proved good quality trees, and a representative collection of budded and marcotted plants obtained from such trees in different parts of the country has already been received.

Ducks.

A flock of ducks for observation and trial has recently been obtained for Tanjong Piandang Padi Test Station in Perak. The birds are stated to be in good condition and are now starting to lay regularly and to use the trap nests. Most of the eggs are laid between 7 and 8 a.m.

DEPARTMENTAL NOTES.

Instruction to School boys in Kedah.

The first part of the annual course of instruction to Standard VI school boys was held at the Telok Chengai Padi Experiment Station from 20th to 26th January, 1939; 18 boys attended and lived at the Station during this period. The syllabus covered an outline of padi cultivation, varieties and their characters, cost of operation, harvesting, threshing, winnowing and milling.

Visitors to the Agricultural Station, Singapore.

The visitors' book at this Station is interesting in that it reveals that Asiatic visitors generally, and the Chinese in particular, are attracted because of their interest in fruit cultivation, whilst Europeans go out of general interest, but generally buy fruit trees before leaving.

Rural Lecture Caravan.

The Rural Lecture Caravan carried out a programme in the Tampin and Seremban Districts of Negri Sembilan from 10th to 29th January, 1939. Attendance at night shows was satisfactory, but afternoon lectures were poorly supported. Wet weather tended to reduce audiences at some centres.

Farm School, Ayer Itam, Penang.

The first year of the School has been completed. Of the 15 students who entered the School, twelve completed the course. A written and oral examination was held; straightforward "theoretical" questions were answered well but answers to more "practical" questions were disappointing. All the students leaving the School have some agricultural project in view. Applications are now being received for this year's course.

Appointment.

Mr. T. D. Marsh, Agriculturist, has been appointed to act as Senior Agriculturist, with effect from 21st December, 1938.

Leave.

Mr. A. de K. Frampton, Agricultural Officer, returned from leave on 13th January, 1939.

Mr. J. R. P. Soper, Agricultural Officer, has been granted 236 days' leave from 28th January, 1939, to 20th September, 1939, inclusive.

FERTILIZER PRICES, JANUARY, 1939.

The following are the prices at the end of January, 1939, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	72.75
Calcium Cyanamide ...	20.6	—	—	—	80.00
Muriate of Potash ...	—	—	—	50	112.00
Sulphate of Potash ...	—	—	—	48	112.00
Superphosphate (concentrated) ...	—	39	—	—	105.00
Superphosphate ...	—	18	—	—	60.00
Basic Slag ...	—	16	—	—	48.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

The above quotations for concentrated superphosphate, superphosphate and Christmas Island phosphate are *ex* warehouse Penang, Port Swettenham and Klang. The Singapore quotations for these three fertilizers are $95, $50 and $31.50 per ton respectively.

Statistical.

MARKET PRICES.

January, 1939.

Major Crops.

Rubber.—The Singapore price of rubber declined during the month. The highest quotation for No. 1 X. Rubber Smoked Sheet, loose, was 28¼ cents per lb. on 1st, and the lowest 25¼ cents per lb. on 27th, the average of daily quotations being 27.26 cents per lb., as compared with 27.75 cents per lb. in December. The London average quotation per lb. was 7.96d. and New York 15.72 cents gold, as compared with 8.01d. and 16.01 cents gold respectively in December.

Prices paid for small-holders' rubber at three centres during January are shown in Table I.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, January, 1939.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Kangsar Perak	Kuala Pilah, Negri Sembilan				Batu Pahat, Johore.			
	18	5	12	19	26	4	11	19	26
Smoked Sheet ...	—	35.00	34.00	—	33.00	—	—	—	—
Unsmoked Sheet ...	31.00	34.20	33.00	33.00	32.00	32.84	33.10	31.45	31.50
Scrap	No purchases								

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.
Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.
Transport from Kuala Kangsar to Prai by railway $6.20 per ton.
Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).
At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.
At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.
No purchases of rubber at Kuala Kangsar on 4th, 11th or 26th.

Palm Oil.—Prices in January were steady at around the level of those ruling during the previous month. The averages of weekly quotations per ton in December were:—palm oil £13-1-3, kernels £8-9-4. Prices in January are shown in Table II.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1939.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
January 6	£ 13. 0. 0 Liverpool	£ 8. 10. 0 Rotterdam
,, 13	13. 0. 0 ,,	8. 12. 6 ,,
,, 20	13. 0. 0 ,,	8. 12. 6 Hamburg
,, 27	13. 0. 0 ,,	8. 10. 0 Rotterdam
Average	£ 13. 0. 0	£ 8. 11. 3

Copra.—The Singapore price of copra remained steady during January with a slight upward tendency. The average Singapore price per picul for sun-dried was $3.30, while the mixed grade averaged $3.00 per picul. Corresponding average prices in December were $3.28 and $2.97 per picul.

The price of copra cake remained steady at $1.60 per picul.

Rice.—The Singapore average wholesale prices of rice per picul in December were as follows:—Siam No. 2 Ordinary $4.27, Rangoon No. 1 $3.20, Saigon No. 1 $3.65, as compared with $4.14, $3.95 and $3.97 in December 1937, and $4.40, $3.50, $3.90 in November 1938. The average prices of these grades during the year 1938 were $4.26, $3.74 and $3.94 respectively as compared with $4.39, $3.75 and $3.92 respectively in 1937.

The average retail prices in cents per gantang (gallon) of No. 2 Siam rice were:—Singapore 28, Penang 32, Malacca 30, and the average prices for the year 1938, were 28, 32 and 28 respectively.

The average declared trade value of imports during December was $3.85 per picul, as compared with $3.85 in November, 1938, and $3.98 in December, 1937. The average price for the year 1938 was $3.93 as compared with $4.00 in 1937 and $3.58 in 1936.

Padi.—Prices paid for padi were easier in the main padi growing areas of Perak and Kedah. In Kedah the price per 100 gantangs (gallons) was between $7 and $8; in North Perak it was from $11 to $12. The price in Central and South Perak was between $9 and $12. Malacca and Negri Sembilan prices were lower, from $7 to $10.75; Pahang $8.50 to $12; Johore $10 to $15; Brunei $10 to $12.

The Government Rice Mill, Krian, Perak, paid $2.10 per picul, and the Government, Rice Mill, Temerloh, Pahang, $2.00 to $2.25. Rice Mills in Kedah paid from $1.85 to $2 per picul.

Pineapples.—Singapore prices of canned pineapples, per case of 48 cans of 1½ lbs. each, were as follows:—G.A.Q. Spiral $2.95, Round $3.80, Cube $3; Golden $3.20, $4.00 and $3.25 respectively.

Business was good, the Golden grades being oversold early in the month and the prices of these grades advanced by approximately 4d. per case.

Fresh pineapples for canning were from $1 to $1.80 per 100 in Singapore. In Johore Bharu the prices were:—first quality $1.20, second $1, third 80 cents. In Selangor from 50 to 80 cents per 100 fruits was paid.

Beverages.

Tea.—Seven consignments of Malayan lowland tea, comprising 474 packages, were sold in the London market during January, at prices ranging between 10½d. to 1s. 0¼d. per lb., the average price being 11.68d. per lb. Five consignments of tea from Cameron Highlands, comprising 390 packages were also sold in London at prices ranging between 1s. 2d. and 1s. 2¾d. per lb., the average being 1s. 2.30d. per lb.

According to *The Tea Brokers' Association of London Reports* for January, the average London prices per lb. realized during the month for tea from other countries were as follows:—Ceylon 1s.2.96d., Indian Northern 1s.1.18d., Indian Southern 1s.1.72d., Sumatra 10.65d., Java 11.70d.

The latest Colombo average prices available, quoted from *The Ceylon Tea Market Report* of 24th January, 1939, of the Colombo Brokers' Association, are as follows, in rupee cents per lb.:—High Grown Teas 76, Medium Grown Teas 68, Low Grown Teas 63.

Coffee.—Liberian coffee was quoted in Singapore throughout the month at $14.50 per picul. Excelsa varied between $10.00 and $10.50, the average quotation being $10.33. Robusta was quoted throughout the month at $6.50 per picul.

The average of highest and lowest quotations in Singapore for Palembang coffee was $13.50 to $11.62, and for Sourabaya coffee $9.50 to $7.19, the price within these figures depending upon quality.

Spices.

Arecanuts—The averages of Singapore Chamber of Commerce quotations per picul were:—Best $7.62, Medium $7.25, Mixed $7.00.

The averages of highest and lowest quotations per picul in Singapore were as follows:—Splits $10.06 to $7.81; Red Whole $7.75 to $5.75; Sliced $6.12 to $4.37; as compared with $7.25 to $4.75, $6.80 to $5.55, and $9.35 to $6.90 respectively in December.

Pepper.—Prices showed an upward movement during the month. Average prices per picul in Singapore were as follows:—Singapore Black $8.50, Singapore White $12.37, Muntok White $12.62 as compared with $8, $11.70 and $11.95 respectively in December.

Nutmegs.—Penang dried nutmegs were sold for $18 per picul. The Singapore prices for both 110's and 80's were quoted at $28 per picul.

Mace.—In Singapore Siouw was quoted nominally at $80 per picul and Amboina at $60. In Penang, locally produced mace, dry, was sold for $70 per picul.

Cloves.—The nominal price in Singapore for both Zanzibar and Amboina cloves was $40 per picul. Penang cloves, dried, sold in Penang for $45 per picul.

Cardamoms.—The price of green cardamoms as quoted in *The Ceylon Chamber of Commerce Weekly Report* for 30th January, 1939, was from Rs. 1.10 to Rs. 1.30 per lb.

Miscellaneous.

Derris.—Average prices in Singapore for January remained unchanged at the previous month's level, *viz*: for root sold on basis of ether extract $8 to $10 per picul; root sold on basis of rotenone content $17 to $19 per picul. The demand shows a slight improvement.

Gambier.—Singapore prices remained at December levels: Cube No. 1 $15 per picul, Block at $7 nominal per picul.

Sago.—The Singapore price of Pearl sago appreciated by 10 cents per picul in the second fortnight of January, the average for the month being $3.75 as compared with $3.70 in December. Flour, Sarawak Fair, averaged $2.19 per picul as compared with $2.13 in December.

Tapioca.—Prices in Singapore remained throughout the month at the following levels per picul: Flake Fair $3.90, Seed Pearl $3.90, Pearl Medium $4.50.

Tobacco.—Prices of locally grown tobacco were lower in most States. Kelantan prices remained high, first grade being from $100 to $160 per picul. In Malacca the price was easier, from $18.50 to $20.50 per picul according to quality. The three grades in Kedah were sold as follows per picul:—$35 to $38, $25 to $26, $14 to $19. In Perak South $24 to $28, $16 to $22, $10 to $18; Central Perak $25.80, $18.50, $9.25; Province Wellesley and Penang, 1st grade $34.50, 2nd grade $27; Negri Sembilan $20 to $50, $15 to $45, $15 to $40. In Johore Central dried leaf was from $5 to $20 per picul, prepared $20 to $80.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co. Ltd., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Messrs. Hooglandt & Co., Singapore.

1 Picul = 133 1/3 lbs. The Dollar is fixed at two shillings and four pence.

Note.— The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57, Trafalgar Square, London, W.C.2.

GENERAL RICE SUMMARY*

December, 1938.

Malaya.—The imports of foreign rice during December were 62,391 tons,† exports were 21,674 tons; net imports were therefore 40,717 tons, as compared with 43,340 tons in November.

Gross imports during the year 1938 were 814,868 tons, exports were 202,474 tons, net imports being 612,394 tons, as compared with 573,063 tons in 1937.

Of the imports during December, 50 per cent. were consigned to Singapore, 17 per cent. to Penang, 6 per cent. to Malacca, 21 per cent. to the Federated Malay States and 6 per cent. to the Unfederated Malay States. The foreign imports, by countries of origin were as follows (in tons, percentages in brackets):— Siam 43,971 (70.5), Burma 15,773 (25.3), French Indo-China 1,817 (2.9), elsewhere 830 (1.3). During the year 1938 the foreign imports by countries of origin were:— Siam 529,389 (65.0), Burma 251,228 (30.8), French Indo-China 21,567 (2.6), elsewhere 12,684 (1.6).

Of the exports during December, 81 per cent. were consigned to the Netherlands Indies and 19 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):— Siam 16,704 (77.1), Burma 42,538 (21.0), French Indo-China 5,875 (2.9), parboiled 534 (0.3), Malayan 31 (0.1). The figures for the year 1938 were as follows:— Siam 152,754 (75.4), Burma 42,538 (21.0), French Indo-China 5,875 (2.9,) parboiled 534 (0.3), Malayan production 773 (0.4).

Net imports of rice during December, by countries of origin, were, in tons:— Siam 27,267, Burma 11,422, French Indo-China 1,259, elsewhere 769.

India.—Foreign exports of rice, January to November inclusive, amounted to 242,000 tons as compared with 675,000 tons in 1937,¶ a decrease of 64.1 per cent.

Of these exports 2.1 (3.9) per cent. were to the United Kingdom, 3.3 (5.6) per cent. to the Continent of Europe, 38.4 (29.0) per cent. to Ceylon, 5.0 (21.0) per cent. to the Straits Settlements and the Far East, and 51.2 (40.5) per cent. to other countries. The figures in brackets are for the corresponding period of 1937.

According to the second rice forecast of All-India for the season 1938-39, the total area under rice is 69,837,000 acres, as against 69,131,000 acres (revised) at this time last year, or an increase of 1 per cent. Weather conditions have not been generally favourable, but the present condition of the crop is reported to be, on the whole, fair.

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* Abridged from the Rice Summary for December, 1938, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout this Summary, that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937.

Burma.—Foreign exports of rice from 1st January to 21st December 1938 amounted to 3,041,668 tons, as compared with 3,162,402 tons in 1937, a decrease of 3.8 per cent. Of these exports, 41.1 (43.9) per cent. were to India, 11.2 (9.6) per cent. to the United Kingdom, 9.2 (11.7) per cent. to the Continent of Europe, 12.0 (11.7) per cent. to Ceylon, 14.5 (14.9) per cent. to the Straits Settlements and the Far East, and 12.0 (8.2) per cent. to other countries. The figures in brackets are for the corresponding period of 1937.

Average December prices in rupees per 100 baskets of 75 lbs. each in Rangoon were:— Big Mills Specials 189, Small Mills Specials 203.

According to the third forecast of the rice crop in Burma for the year 1938-39, the area sown is estimated at 12,808,900 acres, a decrease of 135,700 acres, or 1 per cent. as compared with the final figures for the previous year. The area estimated as destroyed is 169,400 acres, which is 184,100 acres less than last year; three-fourths of the destroyed area is in Upper Burma. The area likely to mature is 12,639,500 acres, an increase of 48,000 acres over the area actually matured last year.

Practically all the principal rice-growing districts of Lower Burma report condition figures considerably higher than those given in the Season and Crop Report for 1937-38, the general condition figure being 99. In Upper Burma where the area likely to mature is short by 57,200 acres, the general condition figure is 91. The condition figure for the country is now 97 as against 93 at this time last year.

The exportable surplus is at present estimated at 3,500,000 tons of rice and rice products which may be taken as the equivalent of about 4,730,000 tons of padi.

Siam.—Exports of rice and rice products from Bangkok during October were 106,421 tons, giving a total of 1,247,654 tons for the first ten months of 1938, as compared with 778,070 tons in 1937.

The crop conditions at the end of November, 1938, may be summarized as follows:— The cultivated area exceeds the second report's figure by 347,876 acres, making a total rice acreage of 7,533,267 acres, of which 694,398 acres (9.2 per cent.) are reported damaged. About 1,052,925 acres have been harvested, with an approximate outturn of 567,251 tons of padi.

According to the first forecast of the rice crop of Siam for the season 1938-39, the total planted acreage is estimated at 8,860,000 acres, and the area damaged at 1,060,000 acres. The total outturn is calculated at 4,898,214 tons of padi. The surplus available for export, including a small carry-over from last year, is estimated at 1,690,476 tons of rice and rice products.

Formosa.—The area and yield of the second rice crop of Formosa for 1938 are estimated at 847,000 acres and 694,000 tons, a decrease of 5 per cent. in area, but an increase of 3 per cent. in yield as compared with 1937.

French Indo-China.—Entries of padi into Cholon from 1st January to 15th December 1938 were 938,876 tons, as compared with 1,352,955 tons in 1937, a decrease of 30.6 per cent. Exports of rice during this period were 1,042,898 tons, as compared with 1,471,190 tons in 1937, a decrease of 29.1 per cent.

In November, there was a steep fall in the price of rice, particularly in the second fortnight. Prices fell from $3.39 per picul to $3.15 on 15th and closed at $2.59. Padi prices declined, but less rapidly. From $2.25 per picul prices fell to $2.21 on the 15th, and to $2.09 on the 30th.

Ceylon.—Imports of rice in 1938 amounted to 522,451 tons, as compared with 515,932 tons in 1937, an increase of 1.3 per cent. Of these imports 18.6 (17.2) per cent. were from British India, 67.8 (70.2) per cent. from Burma, 0.2 (0.6) from the Straits Settlements, and 13.4 (12.0) per cent. from other countries. The figures in brackets are for the corresponding period of 1937.

Europe and America.—Shipments of rice from the East to Europe from 1st January to 1st December were 1,156,256 tons, as compared with 1,058,783 tons in 1937, an increase of 9.2 per cent. Of these 39.7 (40.2) per cent. were from Burma, 47.3 (53.8) per cent. from Saigon, 11.8 (4.4) per cent. from Siam, and 1.2 (1.6) per cent. from Bengal. The figures in brackets are for the same period of 1937.

Shipments for the Levant from 1st January to 23rd November were 29,030 tons, as compared with 16,218 tons in 1937, an increase of 79.0 per cent.

Shipments for Cuba, West Indies and America from 1st January to 15th November were 169,848 tons, as compared with 218,207 tons in 1937, a decrease of 22.2 per cent.

MALAYAN AGRICULTURAL EXPORTS, NOVEMBER, 1938.

PRODUCT.	Net Exports in Tons				
	Year 1937	Jan./Nov. 1937	Jan./Nov. 1938	November 1937	November 1938
Arecanuts ...	30,084	27,005	31,399	2,254	3,131
Coconuts fresh ...	95,223†	86,654†	101,818†	7,332†	13,206†
Coconut oil ...	39,762	36,104	44,032	3,154	5,241
Copra ...	75,592	65,946	64,589	9,150	13,999
Gambier, all kinds ...	1,955	1,889	1,420	244	188
Copra cake ...	15,026§	14,167§	6,486§	1,662§	1,116§
Palm kernels ...	7,312	6,817	8,421	1,399	1,151
Palm oil ...	42,787	39,552	49,866	4,013	2,848
Pineapples, canned ...	80,502	75,401	68,669	3,862	4,060
Rubber ...	503,127¶	452,915¶	24,238¶	43,748¶	335,658¶
Sago,—flour ...	15,478	13,475	3,832	359	217
,, —pearl ...	3,759	3,507	3,953	388	385
,, —raw ...	8,256*	7,583*	4,823*	780*	495*
Tapioca,—flake ...	1,058	1,007	896	83	105
,, —flour ...	2,393*	2,103*	2,843*	254*	220*
,, —pearl ...	18,786	15,491	16,495	1,470	1,416
Tuba root ...	573	549	588	34	93

† hundreds in number. * net imports. ¶ production. § gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1938	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January	2,241.7	1,309.2	383.7	232.0
February	2,040.4	1,457.1	370.4	261.0
March	2,359.6	1,843.1	446.8	344.0
April	1,963.7	1,122.6	353.6	218.0
May	1,491.7	1,480.7	274.8	258.0
June	1,773.5	1,781.2	315.9	247.0
July	2,546.5	2,134.2	450.8	311.0
August	3,587.4	2,798.1	587.8	437.0
September	3,415.9	1,779.2	591.4	289.0
October	2,817.9	2,056.3	483.0	304.0
November	2,451.6	1,934.3	450.1	297.0
December	2,289.1	2,391.7	450.6	422.0
Total ...	28,979.0	22,087.7	5,158.9	3,620.0
Total January to December, 1937	27,733.5	17,932.8	5,094.7	2,811.4

Stocks on estates as at 31st December, 1938, were palm oil 2,361 tons, palm kernels 887 tons.

MALAYAN RUBBER STATISTICS

Acreages of Tappable Rubber actually Tapped and not Tapped on Estates of 100 Acres and over, for the Month ending 31st December, 1938.

State or Territory	Estimated Acreages of Tappable Rubber	Actual area tapped during the month Acreage	Percentage of (3) to (2)	Acreages of tappable rubber not tapped: Estates which have entirely ceased tapping — Acreage	Percentage of (5) to (2)	On estates which have partly ceased tapping: Otherwise than under rotational systems — Acreage	Percentage of (7) to (2)	Under rotational systems — Acreage	Percentage of (9) to (2)	Area of Tappable Rubber never been tapped — Acreage	Percentage of (11) to (2)	Total area not tapped (5) + (7) + (9)	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ...	43,377	19,565	45.1	932	2.1	14,773	34.1	8,107	18.7	456	1.1	23,812	54.9
Malacca ...	121,381	55,612	45.8	4,925	4.1	33,349	27.5	27,495	22.6	2,057	1.7	65,769	54.2
Penang ...	2,478	1,198	48.3	nil	nil	1,220	49.3	60	2.4	9	0.4	1,280	51.7
Singapore ...	32,197	13,364	41.5	5,138	16.0	10,148	31.5	3,547	11.0	161	0.5	18,833	58.5
Total S.S. ...	199,433	89,739	45.0	10,995	5.5	59,490	29.8	39,209	19.7	2,683	1.3	109,694	55.0
F. M. S.—													
Perak ...	285,655	151,533	53.0	10,199	3.6	73,714	25.8	50,209	17.6	7,034	2.5	134,122	47.0
Selangor ...	320,984	192,619	60.0	6,739	2.1	59,005	18.4	62,621	19.5	6,875	2.1	128,365	40.0
Negri Sembilan ...	257,299	134,084	52.1	14,694	5.7	60.772	23.6	47,749	18.6	7,207	2.8	123,215	47.9
Pahang ...	86,751	41,553	47.9	9,024	10.4	24,845	28.6	11,329	13.1	6,832	7.9	45,198	52.1
Total F.M.S. ...	950,689	519,789	54.7	40,656	4.3	218,336	22.9	171,908	18.1	27,948	2.9	430,900	45.3
U. M. S.—													
Johore ...	477,153	261,782	54.9	22,159	4.6	124,771	26.2	68,441	14.3	33,208	7.0	215,371	45.1
Kedah ...	195,802	109,723	56.0	9,617	4.9	34,138	17.5	42,324	21.6	5,974	3.1	86,079	44.0
Kelantan ...	31,261	18,209	58.2	403	1.3	7,580	24.3	5,069	16.2	2,649	8.5	13,052	41.8
Trengganu (*b*) ...	4,817	3,037	63.0	nil	nil	97	2.0	1,683	35.0	74	1.5	1,780	37.0
Perlis (*c*) ...	1,389	592	42.6	323	23.3	310	22.3	164	11.8	98	7.1	797	57.4
Brunei ...	5,826	2,486	42.7	nil	nil	2,637	45.2	703	12.1	264	4.5	3,340	57.3
Total U.M.S. ...	716,248	395,829	55.3	32,502	4.5	169,533	23.7	118,384	16.5	42,267	5.9	320,419	44.7
Total Malaya ...	1,866,370	1,005,357	53.9	84,153	4.5	447,359	24.0	329,501	17.6	72,898	3.9	861,013	46.1

Notes:—(*a*) The acreage shown in column (11) is included in columns (5) and (7).
(*b*) Registered companies only.

MALAYAN RUBBER STATISTICS Table I.

Acreage, Stocks, Production, Imports and Exports of Rubber, including Latex, Concentrated Latex and Revertex, for the Month of December, 1938 in Dry Tons.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports				Exports including re-exports				Stocks at end of month			Consumption 3	
								during the month		January to Dec. 1938		during the month		January to Dec. 1938						
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Dec. 1938	during the month	Jan. to Dec. 1938	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Dec. 1938
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Malay States :—																				
Federated Malay States ...	...	6,047	23,887	10,102	129,728	2,564	54,330	Nil	Nil	Nil	Nil	8,829	2,123	*136,493 †134,100	41,278	...	4,783	26,848	17	196
Johore ...	...	2,052	8,800	4,552	58,213	1,768	32,066	Nil	40	Nil	410	1,731	3,298	31,965	56,175	...	2,155	10,028	...	...
Kedah ...	...	191	5,194	2,545	31,536	452	9,355	Nil	Nil	Nil	Nil	1,363	985	18,960	20,026	...	132	5,902	...	...
Perlis ...	...	11	31	12	144	16	237	Nil	Nil	Nil	Nil	Nil	27	Nil	363	...	5	38	...	...
Kelantan ...	...	399	666	295	4,102	345	6,601	Nil	Nil	Nil	Nil	319	298	3,370	7,331	...	396	692	...	...
Trengganu ...	...	26	281	107	2,773	58	1,449	Nil	Nil	Nil	Nil	Nil	132	5	4,156	...	4	336	...	...
Brunei ...	...	7	81	44	531	26	734	...	...	...	...	...	58	...	1,240	...	Nil	100	...	...
Total Malay States	...	8,733	38,940	17,657	227,027	5,229	104,772	Nil	40	Nil	410	12,242	6,921	190,793	130,569	...	7,475	43,944	17	196
S. Settlements :—																				
Malacca ...	...	1,726	2,132	945	12,582	604	5,995	Nil	6,717	Nil	131,634	1,841	Nil	26,519	Nil	...	1,708	2,340	...	...
Province Wellesley	...	1,503	917	406	4,798	134	2,307	Nil		Nil		4,735		83,848		...	938	1,089	...	...
Penang ...	2,055	4,066	15	18	208	84	898	1,863		29,443						1,969	3,187	15	...	...
Singapore ...	3,386	21,761	291	115	1,605	41	575	5,709		126,108		14,083		225,751		4,183	17,760	282	32	316
Labuan ...	...	26	Nil	Nil	Nil	7	131	35		550		Nil		Nil		...	9	Nil	...	...
Total Straits Settlements ...	5,441	29,082	3,355	1,484	19,193	870	9,906	7,607	6,717	156,101	131,634	20,559	Nil	336,118	Nil	6,152	23,602	3,726	32	316
Total Malaya ...	5,441	37,815	42,295	19,141	246,220	6,099	114,678	7,607	6,757	156,101	132,044	32,901	6,921	526,911	130,569	6,152	31,077	47,670	49	512

*Ocean Shipments from Malaya of rubber directly consigned from F.M.S. †Exports of rubber from F.M.S.

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca.	Johore	Kedah
22	23	24	25	26	27	28
Dry Rubber	4,226	17,296	3,096	2,460	1,820	56
Wet Rubber	557	464	91	195	335	76
Total ...	4,783	17,760	3,187	2,655	2,155	132

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to Dec. 1938
29	30	31
Singapore ...	21,726	352,322
Penang ...	7,174	123,353
Port Swettenham.	3,869	48,884
Malacca ...	132	2,352
Malaya ...	32,901	526,911

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to Dec. 1938
32	33	34
Malay States ...	19,093	318,207
Straits Settlements	1,753	27,094
Malaya ...	20,846	345,301

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula : Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month. + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 25th January, 1939

METEOROLOGICAL SUMMARY, MALAYA, DECEMBER, 1938.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	84.4	71.2	79.8	94	68	75	73	82.5	83.9	5.22	132.6	0.78	16	16	2	4	—	167.10	5.39	45
Bukit Jeram, Selangor ...	87.3	71.7	79.5	91	70	74	74	84.8	86.4	3.49	88.7	0.74	13	12	—	—	—	197.20	6.36	53
Sitiawan, Perak ...	87.8	71.7	79.7	91	67	77	75	82.7	83.7	3.29	83.6	0.84	15	14	1	1	—	186.70	6.02	51
Ipoh Aerodrome, Perak ...	88.8	70.6	79.7	94	65	79	74	82.4	83.6	6.75	171.5	1.32	16	16	2	—	1	181.00	5.84	49
Temerloh, Pahang ...	86.4	71.1	78.7	91	68	73	74	83.7	85.7	8.39	213.1	3.20	17	13	—	8	—	140.80	4.59	38
Kuala Lipis, Pahang ...	86.2	70.3	78.3	93	66	73	74	82.5	84.0	6.43	163.3	2.38	17	15	—	9	—	155.15	5.00	42
Kuala Pahang, Pahang ...	83.0	73.5	78.3	86	71	79	76	81.4	84.5	35.66	905.8	11.15	19	16	1	—	—	158.35	5.11	43
Kallang Aerodrome, S'pore ...	85.7	74.2	79.9	90	73	80	77	81.1	82.5	10.78	273.8	2.61	20	17	3	—	—	146.75	4.73	39
Bayan Lepas Aerodrome Penang ...	86.3	72.6	79.5	90	67	79	76	82.3	83.5	3.00	76.2	0.72	13	10	2	—	—	214.75	6.93	59
Malacca Town, Malacca ...	84.7	72.9	78.8	89	71	75	75	81.8	83.7	8.46	214.9	2.12	15	13	4	—	—	192.00	6.19	51
Kluang, Johore ...	86.0	71.3	78.7	91	69	76	74	80.9	82.2	8.58	217.9	2.91	19	15	4	6	—	158.45	5.11	43
Mersing, Johore ...	82.2	72.4	77.3	85	70	75	77	79.8	81.0	26.07	662.2	7.01	24	20	—	—	3	148.00	4.77	40
Alor Star, Kedah ...	86.6	70.9	78.7	91	65	75	74	83.6	84.8	7.73	196.3	3.38	16	14	—	1	—	199.95	6.45	54
Kota Bahru, Kelantan ...	83.4	71.5	77.5	87	67	74	74	80.4	83.2	24.71	627.6	5.04	20	19	—	1	—	181.90	5.87	50
Kuala Trengganu, Trengganu	83.2	72.0	77.6	86	68	79	77	80.2	82.4	20.83	529.1	7.26	21	19	1	2	—	173.45	5.59	47
Labuan ...	85.1	76.1	80.6	89	72	78	79	83.0	84.7	16.35	415.3	2.89	17	16	1	—	—	209.20	6.75	57
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	69.9	61.1	65.5	75	59	62	63	70.2	71.2	8.05	204.5	1.38	16	15	—	18	—	124.55	4.02	34
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	70.7	53.1	61.9	75	45	65	61	68.2	69.2	8.83	224.3	1.34	17	15	1	1	—	127.85	4.12	35
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	71.0	57.7	64.3	77	52	63	60	*	*	9.08	230.6	1.38	18	15	1	—	—	134.95	4.35	37

* Not recorded.

Compiled from Returns supplied by the Meteorological Branch, Malaya.